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MUNICIPAL MONOPOLIES

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BY
AMERICAN ECONOMISTS AND SPECIALISTS

EDITED BY
EDWARD W. BEMIS, PH.D.
PROFESSOR OF ECONOMIC SCIENCE IN THE KANSAS STATE AGRICULTURAL COLLEGE

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PREFACE.

EVERY one concedes that soon one half of the population of this country will be living in cities of over 8,000 inhabitants, and that to every one of these cities the supply of water, street railways, electric light, gas for fuel and lighting purposes, and the telephone at the command of every one, if not in every home, will have become vital necessities. Nearly every one is also ready to concede that each of these industries partakes of the character of a monopoly.

Although competition has been tried in hundreds of places, combination, either avowed or tacit, has always been the result. The longest continued competition has been between gas and electric light, but consolidation has now occurred among companies producing even such distinct forms of illumination as these.

Three great questions now confront us: Shall we have public regulation, or public ownership and operation? If the former, what shall be the nature of the regulation? If the latter, what are the dangers to be avoided? Upon each of these

questions it is hoped that this book will throw some light.

While the writers of the following chapters are in more or less pronounced sympathy with an extension of public ownership of these city monopolies, the attempt has been made to treat the whole problem broadly, and in full recognition of the difficulties involved in any suggested solution. Without the power of government it is of course impossible to present exhaustive statistics, but it is possible to give more detailed studies of some of the great problems connected with municipal monopolies than is customary in a purely statistical investigation by the government.

In order that more points of view and a wider range of facts may be presented than can be given by any one person, the co-operation of several acknowledged authorities in this line of study has been secured. The result is that Mr. M. N. Baker, of the *Engineering News* of New York City, writes upon water-works; Professor John R. Commons, of Syracuse University, and Professor F. A. C. Perrine, of the Engineering Department of Leland Stanford University, discuss electric lighting; Mr. Max West, Ph.D., of the Agricultural Department at Washington, describes New York City franchises; and Professor Frank Parsons, of the Boston School of Law and the Kansas State Agricultural College, treats of the telephone,

and the legal aspects of municipal problems. The writer has supplied some information on various phases of the electric light, gas, and street-railway questions.

Acknowledgment is hereby given to *Municipal Affairs* for its permission to Professor Commons to use large portions of his article of December, 1897.

While some portions of this work are particularly designed for special students of the subject, it is believed that the book as a whole will be of interest and value to the general reader.

These chapters are now offered to the public in the hope that they will aid in the solution of problems which are of pressing importance to every community in the land.

EDWARD W. BEMIS.

MANHATTAN, KANSAS.
January 25, 1899.

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I.

WATER-WORKS.

WATER-WORKS.

By M. N. BAKER, Ph.B.

Associate Editor of "Engineering News," New York City.
Editor of "Manual of American Water-Works."

THE SUBJECT OUTLINED.

A PLENTEOUS supply of pure water is one of the greatest blessings that can be bestowed upon a community. Like most of the other good things of this world, it does not come for the asking, nor can it be maintained without an effort.

The thoughtless sometimes assert that water should be as free as the air or sunshine; and it has been well said, in reply: so it is, for those who will take a bucket and fetch it. The truth is, that air and sunshine and water are free to man only when he is in a primitive condition. With only the blue sky and the verdant trees to cover him, and mountain walls to hem him in, he may breathe the most bracing air, bask in the warmest sunshine, and drink the purest water without money or question. Once let him pass from his primitive haunts to the condition of civilization, and all changes.

There is no continual supply of fresh air without sufficient ventilation; no sunshine indoors without windows; no water without the labor of the hand or the service of the pump or aqueduct; even a pail in which to carry water costs money, rusts out or wears out, and must be renewed.

The larger the aggregation of human life, the greater the difficulty and expense of securing air, sunshine, and water; until finally large numbers of the people seek homes in the country or in the suburbs, while parks and playgrounds are established for those who must, or through a strange perversity *will*, stay in the crowded cities; and pure water is conveyed from some distant point, or a nearby supply is subjected to a costly process of purification.

Free water, then, is a fallacy; at least for the town-dweller. As a matter of fact, it can be secured only by the co-operation of the financier, chemist, biologist, engineer, health officer, legal adviser, skilled artisan, and humble laborer. The problem of obtaining it is daily becoming more difficult with increasing populations and new uses demanding ever greater quantities. At the same time pure water is becoming more and more inaccessible through the denuding of forest lands, the cultivation of fields, and the encroachments of towns, — all tending to diminish the quantity of water available, and deteriorate its quality.

How this problem of water supply may be best solved is a serious question, especially as the growing scarcity of naturally pure water increases both the cost of water supplies, and the skill, intelligence, and conscientious attention to details necessary in the construction and operation of water-works plants.

The problem is further complicated by the fact, that while in providing many of the other necessaries of life the keenest competition always tends to keep prices at the minimum and quality at the maximum point, here competition is practically lacking, as is easily shown by theory, and abundantly established by experience.

Just how the water-supply problem can best be solved is a matter involving engineering, financial and political considerations, including under the latter head the whole question of municipal ownership. These various considerations are largely interdependent, and can best be discussed by inquiring first, "What constitutes an efficient water-works plant?"

A public water supply should be pure, then plentiful, under good pressure, provided at a minimum expense, and so administered as to raise rather than lower the civic standard of the community.

Purity, for present purposes, may be taken to include all that relates to the quality of the supply,

or an absence of all objectionable matter, whether perceptible or imperceptible to the senses. By far the greatest danger lies in impurities not discernible to the eye, nose, or taste; that is, disease germs, which never get into water unless the latter is polluted by sewage. Water, unpleasant in taste, odor, or color, so high in certain mineral salts as to be termed "hard," or carrying such quantities of silt in suspension as to deserve the name roily, inky, or muddy, at once raises a storm of public protest; but it is never so much to be feared as some clear, sparkling water, pleasant to all the senses passing judgment upon it, but yet carrying thousands of germs of typhoid fever or cholera. These two diseases, it may be stated, are the only ones known to be conveyed from man to man by water, and cholera may be practically ignored in this country. Water and milk are the great carriers of typhoid-fever germs, and are responsible for nearly all the epidemics of the disease that arise. Milk is a source of infection, very largely through the use of polluted water in washing dairy utensils, or (with apologies to the milkman) in diluting milk. With water in both city and country free from pollution from human organic wastes, typhoid fever would disappear almost as if by magic. Other impurities are for the most part unpleasant; this is deadly. Tons of mud in a public water supply may have no other effect

upon a community than temporarily to derange a few stomachs; one or two typhoid cases, improperly tended, in the gathering grounds of a public water supply, may decimate a town, as was the case at Plymouth, Penn., a number of years ago. But while all this is true, mud, bad odors and tastes, color, even if not very decided, and marked traces of iron and hardness, are highly objectionable characteristics of water supplies, and should not be tolerated for a moment when preventable at reasonable expense. Happily new sources of supply, the prevention of pollution, or well-established means of purification, make pure water a possibility for any determined, self-respecting community.

Next in importance to pure water a plentiful supply was mentioned above, and it was said that this should be under good pressure. While for pure water there are certain definite and universal standards, quantity and pressure vary with local conditions. Obviously, other things being equal, a community with large private lawns to sprinkle and many plumbing fixtures in the majority of its houses requires more water per capita than one in which contrary conditions prevail; and greater pressures are needed in towns with four-story buildings than in villages where the maximum height is two stories. But again, the community with small lawns and few plumbing fixtures may have large and numerous manufacturing estab-

lishments, which consume immense quantities of water; and the village with two-story buildings may enjoy a gravity supply from a high mountain source, affording heavy pressures; while the town with tall buildings may be obliged to pump all its water from a level some distance below it, thus making it necessary to supplement the water-works pressure with that secured from fire-engines.

It is far easier to name a figure for maximum consumption than for pressure; since the waste of most communities is, if checked, large enough to afford ample leeway for variations in local conditions. A daily per capita consumption of 100 gallons is considered by engineers as a liberal allowance of water. This figure is often exceeded, owing to the enormous waste in many American cities and towns; but it is also far above the consumption in a number of cities where means have been taken to prevent waste.

As to pressure, no attempt will be made to name a definite figure. Broadly speaking, the pressure should be sufficient to deliver water for domestic purposes on any floor of a house, and to serve for fire protection; although, as has already been said, local conditions may make it necessary or advisable to supplement the water-works plant with the fire-engine. In this connection it should be remembered that it is only for a few hours in a year, comparatively speaking, that there are fires to fight,

so that it may be far cheaper to use fire-engines at such times than to maintain fire pressure constantly. In fact, where water is pumped, a similar practice commonly prevails, even though no fire-engines are used in the streets, reserve pumps for just this purpose being installed and kept ready for immediate use at the pumping-station.

The cost of water also varies with local conditions, and with such a variety of them as to make a single standard of cost impossible, and comparative figures of only general value. It is popularly supposed that water from a gravity source can be furnished at much less cost than where pumping is employed; but this does not always follow, since low operating expenses in the case of a gravity supply may be entirely offset by heavy capital charges on account of large impounding reservoirs and long supply conduits to convey water from distant sources. This popular misconception in itself often increases the cost of public water service; gravity supplies being sometimes used and wasted lavishly because there is no cost for pumping, it being forgotten that with increased consumption larger supply conduits, reservoirs, distributing mains, and other necessities must be provided.

In determining whether a given community is paying more than it ought for its water supply, local conditions should be given more weight than

the cost of water elsewhere, although this last may often be considered to advantage. If the works are owned by a company, the rates for public and private service should yield a fair rate of interest on the capital invested, all risk considered; if owned by the city, the rates should be such as to make the works self-supporting. In either case, the burden borne by the private consumers and the general public, including in the latter water for fire protection, street-sprinkling, sewer-flushing, and public buildings, should be carefully adjusted, so that each shall not be called upon to carry more than its proper share.

The effect of water-works administration upon the civic standard of a community may be either to raise or lower the general character of the municipal officers, to increase or decrease the interest of the best men of the community in municipal affairs, and to lessen or augment the friction which invariably arises to a greater or less extent between private consumers and water-works officials. The form of administration that raises the standard of municipal officers, increases intelligent interest in municipal affairs, and reduces friction to a minimum, is of course the one to be desired, and it may be relied upon to give the most efficient water-works service.

Having noted briefly the prime essentials of an efficient water-works plant, it may be asked whether

they may be best secured under public or private ownership. The question is not easy to answer, owing to its complexity, the difficulty experienced in obtaining the necessary data, and the bearing of local conditions upon each specific case taken into consideration. Fortunately, both the present and past ownership of water-works in the United States and Canada is known, together with such changes as have taken place. These facts and figures will be presented first, as showing the attitude of the country on the subject of ownership.

THE HISTORY AND PRESENT STATUS OF OWNERSHIP OF WATER-WORKS IN AMERICA.

The first public water supply of record in this country was introduced in Boston in 1652, only thirty-two years after the Mayflower cast anchor off Plymouth Rock, and but twenty-two years after the founding and naming of the settlement called Boston.

The choice of the site of Boston was largely due to the fact that a good spring of water existed there, and that the springs at Charlestown had failed, where Governor John Winthrop and his sturdy colony of Massachusetts Bay had settled only a short time before.[1]

[1] See "Boston," by Henry Cabot Lodge, in Longmans, Green, & Co.'s Historic Towns series.

The old records describe the emigration from Charlestown (now a part of Boston) as follows: —

"In the meantime Mr. Blackstone, dwelling on the other side of Charles River alone, at a place by the Indians called Shawmutt, where he only had a cottage at or not far off the place called Blackstone's Point, he came and acquainted the Governor, of an excellent spring there; withall inviting him and soliciting him thither. Whereupon, after the death of Mr. Johnson and divers others, the Governor, with Mr. Wilson, and the greatest part of the church removed thither; whither also the frame of the Governor's house in preparation at this town, was also (to the discontent of some) carried; where people began to build houses against winter; and this place was called Boston."

This early water supply of 1652 was but a small, simple reservoir, to which water was conveyed by gravity through wooden pipes from neighboring springs; but it was a common or public supply for all that, and was doubtless a notable undertaking in those days for the men who incorporated the "Water-Works Company."

More like the modern popular conception of a water-works system were the works built over a hundred years later at Bethlehem, Pa. Here, "after severe struggles," lasting seven years, Hans Christopher Christiansen, a millwright and native of Denmark, completed works in 1761. The water was derived from a spring, as at Boston; but instead of flowing by gravity to a reservoir, it was

lifted seventy feet by a wooden pump to a tank in the village square.

In their early history these works "filled those who saw them with astonishment and admiration;" and on a register kept at that time are the names of many visitors of note, among whom were: "In April, 1768, Governor Penn and Lady and Lord Charles Montague; in 1774, Baron Von Reefsdorf; in 1777, John Adams; in July, 1782, General George Washington, with his adjutants." [1]

Besides Boston and Bethlehem, the only other record of the introduction of a public water supply, prior to the Declaration of Independence, states that two companies built works at Providence in 1772. From this time on through all the Revolutionary period, the formation of the Constitution, and the earlier years of the new republic down through the greater part of Washington's two administrations, or in the fourteen years from 1772 to 1786, only one new water-works is recorded; and this plant, at Geneva, N.Y., was not built until 1787, nearly five years after the acknowledgment of the Independence of the United States by Great Britain.

In the last five years of the eighteenth century the four works built during the previous 145 years were increased by three times that number.

[1] "The Manual of American Water-Works" for 1889–1890, under Bethlehem, Penn.

There were, therefore, at the end of 1800, 16 water-works in the United States, all but one of which had been built, and were then owned and operated, by private parties; Winchester, Va., with works established "before 1800," bearing the distinction of being the only plant then owned by a municipality. The location of these 16 works, the years in which each was built and in which each of the municipalities having private plants, save Morristown alone, changed to public ownership, are given in Table I.

From this small beginning of 16 works at the close of the last century, the number had increased to 3,196 plants early in 1897, supplying more than that number of towns with water for both public and private purposes, while many additional works afforded either an exclusively domestic or an exclusively fire-protection supply.[1]

As has been stated, all but one of the 16 plants in operation in 1800 were under private ownership, and 14 of the 15 private works have since given way to public ownership. While these works have been changing ownership, additional public and

[1] Unless otherwise stated, the term water-works, in this discussion, will denote a plant rendering a supply for domestic and manufacturing or private service, and water for fire protection, street-sprinkling, sewer-flushing, and other public uses. Some of the earlier works afforded only partial service; but this meant much in those days, and such plants will be considered as full works.

TABLE I.

Water-Works in the United States at the Close of 1800.[1]

Located at	Date Built.	Change to Public Ownership.
Boston, Mass.	1652	1848
Bethlehem, Pa.	1761	1871
Providence, R.I.	1772	1871
Geneva, N.Y.	1787	1896
Plymouth, Mass.	1796	1855
Salem, Mass.	1796	1873
Hartford, Conn.	1797	1854
Portsmouth, N.H.	1798	1891
Worcester, Mass.	1798	1852
Albany, N.Y.	1798 or 1799	1851
Peabody, Mass.	1799	1873
New York, N.Y.	1799	1843
Morristown, N.J.	1799	(Still private)
Lynchburg, Va.	1799	1828
Winchester, Va.	Before 1800	(Always public)
Newark, N.J.	1800	1860

SUMMARY BY STATES.

New Hampshire,	1	Connecticut,	1	Pennsylvania,	1
Massachusetts,	5	New York,	3	Virginia,	2
Rhode Island,	1	New Jersey,	2	Total,	16

private works have been changing from one class to another, by purchase or by being crowded out through competition. Of the 3,196 works at the beginning of 1897, over half, or 53.2 per cent, were owned by the municipalities in which they

[1] These figures and those in the three following tables are compiled from "The Manual of American Water-Works" for 1897, and previous issues of the same work, all edited by the author, and published by the Engineering Publishing Company, New York.

are located, there being 1,690 public and 1,489 private works, besides 12 of the joint and five of unknown ownership. The number of works of each of these two classes, with the corresponding percentages at the close of each half decade, is shown by Table II.

TABLE II. Number of Public and Private Works in the United States at the End of Each Half Decade, Beginning with 1800.

Year.	Public.	Private.	Total.	Per Cent. of Total.	
				Public.	Private.
1800	1	15	16	6.3	93.7
1805	2	21	23	8.7	91.3
1810	5	21	26	19.2	80.8
1815	5	21	26	19.2	80.8
1820	5	25	30	16.6	83.4
1825	5	27	32	15.6	84.4
1830	9	35	44	20.5	79.5
1835	15	39	54	27.8	72.2
1840	23	41	64	35.9	64.1
1845	27	43	70	38.6	61.4
1850	33	50	83	39.7	60.3
1855	48	58	106	45.3	54.7
1860	57	79	136	41.9	58.1
1865	68	94	162	42.0	58.0
1870	116	127	243	47.7	52.3
1875	227	195	422	53.8	46.2
1880	293	305	598	49.0	51.0
1885	447	566	1013	44.1	55.9
1890	806	1072	1878	42.9	57.1
1896	1690	1489	3196[1]	53.2	46.8

At the end of the first quarter of the present century the number of works had exactly doubled;

[1] Include 12 of joint and 5 of unknown ownership.

but yet there were only 32 plants, and all but five of these were owned by private companies or by individuals, four public works having been added in the first ten years of the period, but none from 1810 to 1825, or during the second war period of the country and the years immediately preceding and following it.

From 1825 to 1855 the percentage of public works increased from 15.6 to 45.3 of the total; but the agitation preceding the Civil War, and the war itself, set back the development of public works to 42 per cent in 1865. In 1863, the central year of the struggle, not a single water-works plant was built. The ten years following the war foreshadowed the rapid water-works development of the last ten or eleven years, the total number of plants increasing from 162 in 1865 to 422 in 1875. At the same time there was renewed activity in the construction of works by cities and towns, public ownership reaching 53.8 per cent of the total in 1875, which was high-water mark. From 1875 to 1890, Table II., shows a great increase in the number of works; but in these fifteen years franchise-getting became a business, and private ownership again shot ahead, public ownership falling to 42.9 per cent in 1890, or about what it was at the close of the Civil War.

These fifteen years, from 1875 to 1890, were the palmy days of water-works promoting. There were

many large towns still dependent upon polluted surface wells for a water supply, and municipal improvements and rapid growth in population were the order of the day.

The numerous demands upon municipal treasuries for public works not ordinarily carried out by private capital made it especially easy to intrust to companies those classes of works where private ownership had been always in the ascendant. Hence horse railways continued wholly under private ownership; gas-works almost universally so; and water-works, which for the most part had always numbered more company than city plants, fell a little on the city side of the scale. Water-works grew rapidly in numbers in order to keep pace with the increasing demands of urban populations for the comforts and conveniences of modern plumbing, while a growing appreciation of the dangers arising from depositing human wastes in, and drawing water for household use from, holes in the same dooryard stimulated still further the desire for water-works. The growth of cities in population resulted in the closer building up of urban areas and in greater fire risks, so that works were imperatively demanded for fire protection. Health was endangered by impure water, and life and property by the lack of ample quantities of water of any kind. The competition of city with city, town with town, and village with village, made

water-works seem to be an imperative necessity. Such private plants as had been built had been successful in the main, at least where well managed. In fact, it was for many years the boast of dealers in the water-works securities that no water company had yet defaulted on its bonds.

As a result of all these conditions, promoters found it easy to secure water-works franchises, and also easy to enlist capital to build works, or to sell for a handsome sum the franchises which the public had given them for the asking. These sales would be made before anything had been done towards the actual construction of works. Manufacturers of and dealers in supplies accepted water-works securities in settlement for their claims, or even secured franchises and built works to find a market for their material. In view of all these facts, it is not surprising that of 1,878 water-works in the United States at the close of 1890, only 806 or 42.9 per cent should have been owned by the respective municipalities in which they were located.

In the last six years the tide has set the other way, and municipal ownership has been on the increase. This has come about partly because the larger towns, those most attractive to private capital, are now all provided with works, so that it is less an object than formerly to secure water-works franchises; partly because it is less easy than a

few years ago to get a franchise, owing to a growing sentiment in favor of public works; and partly because the cities and towns have been buying the private works for operation on their own account.

This change in sentiment and practice is due to the pronounced feeling for public ownership of water-works, evident ever since the first third of the century passed, as is shown by Table II., and to the further fact that municipal finances are now in better condition than formerly, thus allowing public ownership where it was previously impossible. Added to this is the fact that the whirlwind is now being reaped where the wind was sown, by both promoters and cities, a few years back. Franchises were granted and accepted on almost any terms, being generally, but not always, most favorable to the recipient. They were carelessly drawn, from the standpoint of both parties in interest, although the promoters were experienced in franchise matters, and the cities generally quite inexperienced, or they failed to profit from the plain lessons of the past, so that the city was quite sure to get the worst end of the bargain. In some sections the rates for public and private services, as fixed in the franchises or contracts, were too high from the start, or became burdensome when the reverberations of the boom, so characteristic of a few years ago, were suddenly followed by a painful silence. The several unfortunate circumstances

named, with their accompanying friction between private consumers and water companies, and various conflicts between municipalities and companies, have tended largely to bring the latter into disfavor. This tendency has been increased by a growing belief, sometimes well founded and sometimes not, that large dividends are paid on actual or watered stock; that valuable franchises of all sorts have been granted in the past without due consideration of the rights of the people contributing to their value; and by the financial straits and receiverships of many companies, caused often by the fast and loose speculative games of their original promoters.

It is not strange, then, that early in 1897 public water-works in the United States outnumbered private by about 200, the whole number of publicly owned works being 53.2 per cent of the enormous total of 3,196 plants.

The two great causes for this swing from private to public preponderance of ownership have been the number of small public works built in the last six years, notably in the Northwestern States (see Table III. for classification), and the numerous changes of late from private to public ownership.

The present number and ownership of water-works in each State of the Union, and the total number of changes within the century from private

to public ownership, and the reverse, are shown by Table III.

TABLE III. Number and Ownership of Water-Works, by States, early in 1897, and Changes in Ownership.

States and Groups.	No. and Ownership of Works.					Changes in Ownership.	
	Total.	Public.	Private.	Joint or Unknown.	Per Cent Public.	Private to Public.	Public to Private.
Maine	57	7	50	0	12.3	2	0
New Hampshire	53	24	27	2	45.3	11	0
Vermont	46	29	17	0	63.0	6	0
Massachusetts	151	113	38	0	74.8	29	0
Rhode Island	15	6	9	0	40.0	2	1
Connecticut	59	15	44	0	25.4	3	0
New England States	381	194	185	2	50.9	53	1
New York	342	172	170	0	50.3	26	1
New Jersey	93	35	58	0	37.6	8	0
Pennsylvania	342	82	259	1	23.9	14	1
Delaware	7	6	1	0	85.7	1	0
Maryland	29	9	20	0	31.0	2	0
District of Columbia	1	1	0	0	100.0	0	0
Middle States	814	305	508	1	37.5	51	2
Virginia	48	24	24	0	50.0	4	0
West Virginia	23	12	10	1	52.1	1	0
North Carolina	18	5	13	0	27.7	1	0
South Carolina	12	4	8	0	33.3	0	1
Georgia	36	26	10	0	72.2	3	0
Florida	19	6	13	0	31.6	0	0
South Atlantic States	156	77	78	1	49.3	9	1
Alabama	29	9	20	0	31.0	2	1
Mississippi	9	3	6	0	33.3	0	0
Louisiana	10	3	7	0	30.0	0	1
Tennessee	28	10	18	0	35.7	1	1
Kentucky	44	15	29	0	34.0	0	2
South Central States	120	40	80	0	33.3	3	4

TABLE III. — *Continued.*

States and Groups.	No. and Ownership of Works.					Changes in Ownership.	
	Total.	Public.	Private.	Joint or Unknown	Per Cent Public.	Private to Public.	Public to Private.
Ohio	149	114	35	0	76.5	3	0
Indiana	111	71	39	1	63.9	3	0
Michigan	156	126	30	0	80.8	5	1
Illinois	201	158	43	0	78.6	10	1
Wisconsin	92	56	35	1	60.9	4	0
North Central States	709	525	182	2	74.0	25	2
Iowa	170	140	28	2	82.4	2	0
Minnesota	93	81	12	0	87.1	7	1
Kansas	91	45	45	1	49.4	7	2
Nebraska	91	80	11	0	87.9	3	0
South Dakota	31	23	8	0	74.2	1	0
North Dakota	10	8	2	0	80.0	2	0
Wyoming	13	8	5	0	61.5	2	0
Montana	16	2	14	0	12.5	2	0
Northwestern States	515	387	125	3	75.1	26	3
Missouri	62	21	41	0	33.8	2	1
Arkansas	20	4	15	1	20.0	0	0
Texas	86	23	60	3	26.3	7	4
Colorado	68	43	25	0	63.2	7	0
New Mexico	10	1	9	0	10.0	0	0
Oklahoma	6	3	3	0	50.0	0	0
Southwestern States	252	95	153	4	37.7	16	5
Washington	51	25	26	0	49.0	8	0
Oregon	37	15	21	1	40.5	4	0
California	121	19	101	1	15.7	10	0
Arizona	5	1	4	0	20.0	0	0
Nevada	9	0	9	0	0.0	0	0
Utah	11	6	4	1	54.5	0	1
Idaho	14	1	13	0	7.1	0	0
Alaska	1	0	0	1	0.0	0	0
Pacific States	249	67	178	4	26.9	22	1

TABLE III. — *Continued.*

States and Groups.	No. and Ownership of Works.					Changes in Ownership.	
	Total.	Public.	Private.	Joint or Unknown.	Per Cent Public.	Private to Public.	Public to Private.
New England	381	194	185	2	50.9	53	1
Middle	814	305	508	1	37.5	51	2
South Atlantic	156	77	78	1	49.3	9	1
South Central	120	40	80	0	33.3	3	5
North Central	709	525	182	2	74.0	25	2
Northwestern	515	387	125	3	75.1	26	3
Southwestern	252	95	153	4	37.7	16	5
Pacific	249	67	178	4	26.9	22	1
Total United States . .	3196	1690	1489	17	52.9	205	20
Canada	145	109	35	1	75.2	19	0
Total	3341	1799	1524	18	53.9	224	20

Considering first the present ownership of the works, it will be seen from the summary by groups at the end of Table III., that the New England and South Atlantic States are about equally divided in ownership; that the Middle, South Central, Southwestern, and Pacific States have a decided tendency toward private ownership, while the North Central and Northwestern groups have an equally decided contrary bent. The extremes are the Pacific States, with only 26.9 per cent of public works, and the Northwestern, with 75.1 per cent.

In many instances one or more States within a group are at direct variance with the group as a whole. Thus, in New England, with ownership

almost equally divided between the two classes, Maine has but 12.3 per cent of public works, and Massachusetts has 74.8 per cent. Similar divergences may be seen in the other groups by examining Table III.

For convenience in studying ownership by States the percentages of public works have been arranged from least to greatest in Table IV., which needs no discussion.

TABLE IV.

Percentage of Public Water-Works in each State.

Alaska	0.0	New Hampshire	45.3
Nevada	0.0	Washington	49.0
Idaho	7.1	Kansas	49.4
New Mexico	10.0	Oklahoma	50.0
Maine	12.3	Virginia	50.0
Montana	12.5	New York	50.3
California	15.7	West Virginia	52.1
Arizona	20.0	Utah	54.5
Arkansas	20.0	Wisconsin	60.9
Pennsylvania	23.9	Wyoming	61.5
Connecticut	25.4	Vermont	63.0
Texas	26.3	Colorado	63.2
North Carolina	27.7	Indiana	63.9
Louisiana	30.0	Georgia	72.2
Alabama	31.0	South Dakota	74.2
Maryland	31.0	Massachusetts	74.8
Florida	31.6	Ohio	76.5
Mississippi	33.3	Illinois	78.6
South Carolina	33.3	North Dakota	80.0
Missouri	33.8	Michigan	80.8
Kentucky	34.0	Iowa	82.4
Tennessee	35.7	Delaware	85.7
New Jersey	37.6	Minnesota	87.1
Rhode Island	40.0	Nebraska	87.9
Oregon	40.5	District of Columbia,	100.0

Changes from private to public ownership during the century have numbered 205 works, and reverse changes but 20, all as shown by States in Table III. Had there been no changes in ownership, the number of public works would now be about 1,500, and the number of private works about 1,675. Nearly one-eighth of all the private works built have therefore changed to public ownership while only about one seventy-fifth of the public works have changed to private ownership. Kentucky, Kansas, and Texas are the only States reporting more than one change from public ownership, the twenty changes being in fifteen States, and the remaining States reporting no change.

On the other hand, the 205 changes from private to public ownership have been made in thirty-six States, Massachusetts showing 29 such changes, and New York 26. As Massachusetts has less than half as many works as New York, its changes are far more significant. Without these changes Massachusetts would now have eighty-four public and sixty-seven private works, showing that over 40 per cent of the works built by private companies in Massachusetts have given way to public ownership. In the whole of New England there have been fifty-three changes from private to public ownership, or over one-fifth of the private works built have given way to public. Other in-

teresting comparisons may be drawn from the right-hand columns of Table III.

The previous discussion regarding ownership has been based entirely on numbers of works. If the relative populations supplied by public and private works were available, the showing would be far more surprising. For the country as a whole, the latest reliable figures for population are those of the census of 1890. To estimate the present population of more than 3,000 cities and towns is entirely out of the question. The population supplied by public works in 1890 was 66.2 per cent of the total population in municipalities having water-works facilities, or 15,019,000 out of 22,678,000. In the last six years the percentage has doubtless held its own, if not materially increased; the net gain in public works being 800, against 400 private, while many of the works contributing to this greater gain in public ownership have been in cities of fair size, the largest being Syracuse, N.Y., and Kansas City, Mo.

Of the fifty largest cities in the United States, twenty-one have always owned their works, twenty have changed from private to public ownership, and only nine are now dependent upon private companies for their supply, these nine being as follows: San Francisco, New Orleans, Omaha, Denver, Indianapolis, New Haven, Paterson, Scranton, and Memphis. The New Orleans works were

once bought by the city, and after a few years sold again to a company.[1]

Canada shows a stronger belief in municipal ownership of water-works than the United States. Table III. gives the total number of works in Canada as 145, of which 109, or 75.2 per cent, are owned by the public. There have also been a large number of changes of ownership in Canada, all from private to public. Of fifty-four private plants recorded as having been built, nineteen, or over one-third, have been bought by the municipalities in which they were located.

In both the United States and Canada there are at the present time many cities and towns proposing to establish municipal works, either by purchase of existing private plants or by the construction of competing works.

The practice of the various States in this matter of securing municipal works where private plants already exist is very interesting, partly because of the divergences that exist. In Massachusetts, the municipalities never attempt, at least in late years, to build works to compete with private plants. In the case of cities and towns having companies

[1] A detailed list of changes in ownership, including the year of change, the year works were built, and the population of the place in which the works are located, is given in the introduction to "The Manual of American Water-Works" for 1897, edited by the author. In the body of the Manual additional details regarding many of the changes are given.

operating under old charters, the common practice is for the city to assume control of private works immediately after voting to buy the same, the price to be paid by the city for the works being determined later by arbitrators appointed by the courts of the State, the appointing court having power to approve or disapprove of the price fixed by the commissioner.

In New York and Pennsylvania the respective courts have rendered decisions contrary to each other regarding the building of competing works by a municipality. The New York courts have decided that a city, in granting a franchise for water-works, does not debar itself from erecting and operating a plant; while the Pennsylvania courts have given a contrary opinion. In both States, certain classes of municipalities, if not all, seem to possess the right to buy private works at an appraised valuation.

Several States have passed, or tried and failed to pass, laws providing that no municipality supplied with water by a private company shall build works without first buying the property of the company. Such a law has failed to pass once or twice in the Pennsylvania legislature. The Montana legislature passed such a law, but it has been declared unconstitutional by the courts of that State.

Other States have had bonded debt limits or

prohibitions that have prevented municipal ownership of water-works, either through construction or purchase. On the other hand, some States have made it particularly easy for municipalities to buy works; Indiana, for instance, authorizing the construction of works by companies, with the distinct understanding, or contract provision, that the city, through annual payments to the company, should become owners of the works at stated times.

From the foregoing it is evident that the desire for municipal ownership of water-works is very strong at present, and that the number of public plants has been increasing largely of late. From the early part of the century a large percentage of the total number of works have been owned by municipalities, and more than half of the works are now so owned. As cities increase in size, municipal ownership seems to become inevitable; but hosts of small places have built works, instead of relying on private capital, and many small towns have bought out companies. The indications now are that municipal ownership of water-works will increase for some time to come; and that, through changes to public ownership in many of the large places still supplied by companies, only a small percentage of the total population dependent on water-works will, in a few years, look to private companies for their supply.

THE PROPER BASIS OF PRIVATE OWNERSHIP.

Whatever may be one's ideas regarding the relative advantages of private and public ownership, the fact that both exist, and will continue to exist in varying proportions, makes it desirable to consider the proper basis of each.

From the standpoint of the water-users the essentials are good service and low cost. How can these best be secured under each form of ownership? Considering private works first, it is evident that a city or town must previously guard its interests in the granting of a proper franchise, and next see to it that the conditions of the franchise are fulfilled.

What are the elements of a proper franchise? The fundamental principle involved is that the water-works franchise confers upon private parties the right to dig up, occupy, and use streets constructed and maintained at public expense, thus interfering more or less with the use of the public highway for street traffic. Further than this, the right to use the streets is accompanied by the right to do so for private gain, through the collection of rentals for water furnished. On the other hand, the recipients of such franchises place themselves under obligations to supply water for public and private purposes, thus making themselves public servants.

If a franchise is a valuable privilege granted by a city or town, and if its acceptance carries with it obligations on the part of the grantees, it follows that these obligations should be commensurate with the privileges. Obviously they cannot be fixed, or justly fixed, for all time, owing to rapidly changing conditions. Franchises, therefore, should not only be drawn with an idea of securing adequate return to both sides, but for limited periods, in order that readjustment may be made from time to time. In other words, a water-works or any other franchise, involving the use of the public streets, should be considered as a lease, rather than a sale, or, as is far too often the case, an out-and-out gift. The life of a water-works franchise, and various local conditions, may also vary. The less control the terms of a franchise reserve to the city, in the way of regulation of rates, character of service rendered, and right of buying out the company, the shorter should be the life of the franchise. Generally speaking, twenty-five years may be considered as a long franchise under any conditions approaching the normal.

The stipulations regarding the character of service to be rendered are largely both local and engineering matters, to be determined by the exigencies of each case. A general idea of the functions of a water-works plant has already been outlined in the preceding pages.

It seems almost needless to say that all the conditions of a franchise should be plainly stated, so as to leave as little chance as possible for differences of interpretation. Ambiguity and indefiniteness are seeds from which spring annoying and expensive crops of litigation, neither city nor company being willing to acknowledge itself in the wrong.

The rates for public and private service should be very definitely and plainly set forth in all franchises, or the contracts supplementary to those documents. It is highly desirable for all parties that the rates be fair to both sides, for obviously good service cannot be rendered without a proper return to capital; and neither public nor private consumers will rest contented if a well-founded belief gets abroad that the rates are too high.

The only proper basis for both public and private rates is the cost of service rendered, including operating expenses and capital charges. Publicity of accounts is the only means of maintaining rates on any such basis. Much educative work must yet be done before water rates will be established in this way, as a universal practice. Meantime the secretive policy now followed will continue to breed suspicions of huge profits, with demands for lower rates on every possible occasion. The people failing in such demands, there will continue as heretofore threats or attempts to annul franchises on the ground of legal flaws.

Franchise provisions for the regulation of rates are sometimes made with advantage, but there are difficulties and uncertainties in carrying them into effect. If a franchise expires at the end of fifteen or twenty years, the company will see that its renewal is not overlooked by the city council; and if the rates are to be readjusted merely, the company is not to be blamed if it fails to urge the adoption of a new schedule, and city councils are at times wonderfully apathetic in these matters.

Above all things, when an attempt is made to fix the water rates in a franchise, specific figures should be named, instead of inserting some "will o' the wisp" provision for rates not to exceed those in some other city or cities. Water rates in most cities, under either public or private ownership, are fixed in an unscientific way, and vary so much in method of readjustment as to make averages difficult or impossible, according to the number and character of the works to be included in the average.

Assuming the proper franchise in existence, it was stated above that it is necessary to enforce its provisions. It should be remembered that there are mutual obligations here, and that the city should live up to its agreements if the company is expected to do the same. Generally speaking, however, the main obligations assumed by the city are payments for the various public services rendered,

obligations so obvious to all, and the fulfillment of them so imperative to the life of the company, that attempts to evade them have little chance of success, except when the company has not fulfilled its contract, or when the franchise is weakened by legal flaws. The obligations of the company are so various, and hinge on so many technicalities of law and engineering, that it is often no easy matter to determine them with exactness, much less to enforce them fully and impartially. Generally speaking, the engineering questions all center around the quality and sufficiency of the supply, using the word sufficiency to designate both quantity and pressure; while the legal questions relate to the interpretation of the meaning of the contract and various technicalities. Good engineering and legal advisers should be employed by the city to determine clearly and protect fully its interests, and the advice should be followed with promptness and vigor. The strongest safeguard of either public or private rights is the knowledge that no pains will be spared to determine and enforce them. Too many cities let all franchise matters drag on loosely until complaints against companies become so frequent and pronounced that they can no longer be ignored. At this juncture the too common practice is either to make a mere feint at probing the trouble, or to go about it in a bull-headed and antagonistic way. Most

franchise companies wish to avoid irritation and conflict; but all will resist attempts to drive them, whatever the question at issue, preferring to yield even a big point rather than be driven to perform some small, obvious duty.

Of course there are dishonest city officials, who prefer to connive with companies to their own corrupt personal gain, rather than encourage or force them to conform their actions to the public good; and there are unprincipled companies willing to meet such city officials half way, or more. There are also ignorant and headstrong persons on each side. Public sentiment must be educated to make all these undesirable facts things of the past. In the final analysis the whole matter of good city service, be it water-works or otherwise, depends upon the people who select, or by staying away from the polls fail to select, their public servants. Municipal misrule and poor service depend more on men than on methods. The man who stands ready to secure personal advantages or profit to the detriment of those whom he has been chosen to serve will not be at all particular whether he does this through public or private ownership of municipal monopolies.

THE PROPER BASIS OF PUBLIC OWNERSHIP.

Some of the earliest water-works plants of the country consisted of a small and short pipe-line

from a spring on the hillside to a few houses below it. Those supplied with water — "running water," as it was designated with much pride and satisfaction — contributed equally to the cost of construction and the small expense necessary to maintenance. Similar pipe-lines, or aqueducts as they were called in the early days, are still in use in many small villages in hilly or mountainous sections abounding with springs. The water supply in such cases is purely a co-operative affair, each paying his proper share of the expense involved, and no attempt being made to realize a profit for the benefit of any one.

A modern water-works plant owned by a city is, or should be, but an expansion of this co-operative idea, rendered somewhat more complex because of the demands of the consumers for varying quantities of water, and by the fact that the municipality itself is also a consumer. But the difference is principally one of detail. The same principles of construction and operation govern as under private ownership, and each kind of ownership is dependent upon good business management for success. The great dangers of public ownership are (1) that political rather than business methods may dominate, and (2) that the cost of supplying water will not be properly divided between public and private consumers. The latter danger also pertains to private ownership; since

companies secure their revenues where they meet with the least resistance, and will agree to accept a low hydrant rental where they can suit themselves in the matter of private rates, or *vice versa*. Under public ownership some cities collect little or nothing in the general tax levy for the support of the water-works, covering the whole expense by the rates charged private consumers; while in others the pressure for low private rates results in meeting nearly all the water expenses by general taxation. It must also be borne in mind that political parties and franchise companies often have a strong blending of interests.

A water-works plant owned by a municipality should be as truly self-supporting as one owned by a private company; and those benefited by the water supply should foot the bills, each in his proper proportion, as much under one plan of ownership as under the other.

As stated in the introductory chapter, the cry that water should be free as air is a delusion. It cannot be supplied to a city without expense, and the expense must be met in some way. The municipality, under either plan of ownership, should see that this expense is properly distributed, both among different private consumers and the general public. The latter is benefited by the water used or available for fire protection, and by the amount consumed in watering streets and parks, flushing

sewers, and supplying public fountains and public buildings. The proper proportions of cost to be met by the public and private consumers, and the subdivisions of each, are matters for engineers and water meters to decide. The latter will indicate the relative amounts actually consumed by classes or individuals; but the cost of the public service depends far less upon the total consumption in a year than upon the comparatively vast quantities which may be demanded on special brief occasions, principally at fires. Thus the use of water for all public purposes may be not over five per cent of the total consumption for the year, but the whole system must be so proportioned as to be capable of delivering an enormous increase of volume during a severe conflagration. Operating expenses may be increased but slightly on this account, but first cost and capital charges may be much more than doubled.

The necessity of conducting municipal water-works on a strictly business basis, if the best results are to be obtained, was mentioned above in connection with the danger that the cost of service will not be properly distributed among those benefited. It would be hard to say anything new on this subject, and it has already been commented on in the previous section. Its importance is more fully recognized by word than by deed, but the strong wave of municipal reform now sweeping

over the country will have its good effect here as elsewhere.

ADVANTAGES OF PRIVATE OWNERSHIP.

There is undoubtedly much to be said on both sides of the subject when the relative advantages of private and public ownership are taken into consideration. In this and the succeeding section an attempt will be made to sum up as impartially as possible the strongest points on each side.

The greatest argument for private ownership, and one that in a measure includes all others, is that under it every endeavor is made to conduct the works in the most prudent and economical manner, in order to insure the greatest possible return on the capital. It is urged that material costs no more under private ownership, and that labor is generally much cheaper, since shorter hours and higher wages prevail among municipal than among private employers. There is undoubtedly much force in the contention regarding wages, especially those of unskilled day laborers. The ultimate economy of longer hours is at least open to question. On the whole, material may cost private companies no more than cities; but it is a notable fact that most contracts for city water-works are awarded only after well-advertised calls for bids, and must then be given to the lowest bidder. Unfortunately, there are deals and "divvies" be-

tween city officials and contractors; but there is always the danger of exposure and punishment here, while the officials of private companies can make similar arrangements with contractors with far less likelihood of being discovered or punished, especially when new works are being built to unload on holders of securities. In the latter case, construction companies, openly or secretly composed of the first officials of the water companies, often receive the contracts; or works are built by supply men or contractors for the sole purpose of making as great a profit as possible on the material and labor involved. The bulk of the original construction, at least of the public works, is done by contract, in which case the question of higher wages for ordinary labor is not involved. The executive positions in private companies often command better pay than similar ones under public ownership, but in the long run this is advantageous to the private works.

The absence of political considerations, generally speaking, from the management of private works, is undoubtedly a great advantage. That they do enter in at times is frequently alleged, and doubtless true; but, while this is bad for city government, in general companies go into politics to further their own ends, as, for instance, when they give employment to friends or followers of politicians in return for support from the latter in se-

curing or renewing franchises, or in preventing the enforcement of franchises or contracts.

Private companies less often than cities extend their mains into sparsely settled districts, where new business will not warrant the expense; and they certainly will not be accused of lowering rates unduly for political effect, as cities sometimes do.

One of the most common objections to municipal ownership is the allegation that under it there is constant change in the personnel of the officials in charge of the water-works. So far as I know, this claim has never been either disproved or proved by actual investigation of records, being put forward, like so many others, on general impressions. I have been at great pains to get some facts bearing directly on this subject, and find that such records as I have composed support the claim, although not so strongly as I had expected at the start. My study is based on only one class of officials, water-works superintendents. This class was selected because it stands more nearly on the same footing than any other in both private and public plants, and is more universal. The study is based on the names given in "The Manual of American Water-Works" for 1897, as a basis, compared with those in the Manual for 1890–1891, and the "Statistical Tables of American Water-Works" for 1887 and 1883, the returns of names of super-

intendents in each book covering respectively the years 1896, 1891, 1886, and 1882, as nearly as possible, thus giving approximately 5, 10, and 14 year periods. As we go back in years the number of works in existence decreases very rapidly, and some works are found for which the names of the superintendents are not given. This accounts for the fact that the total number of works involved in the 5-year period is 901; in the 10-year, 399; and in the 14-year only 269. These works are distributed throughout the whole of the United States, but include no Canadian plants. The changes in the various periods are given in Table V.

TABLE V. Changes in Superintendents of Water-Works Plants, 1891–1896, 1886–1896, and 1882–1896.

	Companies.		Cities.		Total Reporting.	Per Cent Changes.	
	Change.	No Change.	Change.	No Change.		Co's.	Cities.
1891–1896,	204	332	198	167	901	38	54
1886–1896,	112	72	148	67	399	60	69
1882–1896,	71	36	125	37	269	66	77

The figures for the 5-year period cover nearly half of the works in operation in 1891, or 901 out of 2,037. Of the 536 companies included, only 38 per cent changed their superintendents in this time; while of 365 public works, 198, or 54 per cent, displaced old with new men. The two other periods show much less relative change, 60 per cent of the companies, and 69 per cent of the

cities, changing in the 10-year period, and 66 per cent of the companies, and 77 per cent of the cities, changing in the 14-year period.

These figures, like all similar ones, should be used with caution. They can be accepted as showing the general relative tendency to change superintendents under each plan of ownership, in each period; but comparisons of periods might be misleading for several reasons. It would be interesting to compare the figures by periods for those works only for which the superintendents are given in each of the four publications used in making up the data; but as the number of such works must, of necessity, be less than 269, the number for the 14-year period, and as the result would probably not throw any great light on the subject, the task was not undertaken.

Works great and small were included in the above summary; and no account was taken of changes in the other officers of the several plants, or change of financial or political control in the case of private and public works, respectively.

In conclusion, this question may be left to the consideration of the reader: Supposing it could be satisfactorily proven, by exhaustive statistics, that a private company can build and operate waterworks at less expense to itself than can a municipality, to whom does the benefit accrue, the water consumers, or the holders of the company's stock?

ADVANTAGES OF PUBLIC OWNERSHIP.

One of the most obvious advantages of public ownership is lower capital charges. A municipality can float bonds at a lower rate of interest than a private company, since the whole assessable property of the town is generally liable for the payment of interest and principal, while a company can give security only on the works. Besides this, the company seeks to pay as high dividends as possible on its capital stock; while the municipality need only pay the interest on its bonds, and may turn any profit above this and operating expenses into the general treasury, to help meet other expenses, or else lower the water rates. Furthermore, it is no uncommon thing for a company to bond a plant nearly up to its actual cost, and then issue stocks to an equal amount, on which it attempts to pay dividends. Thus, even if a municipal plant were actually to cost more than a private one, its capital charges, in most cases, would probably be less. The chances that municipal plants will actually cost more are diminished by the public lettings of bids, which often result in great competition and low prices. Seldom is private work publicly advertised, thus affording rare opportunity for "deals."

Another advantage of city ownership is that no taxes are levied by the city on its own property,

and hence this item of expense is eliminated. It is true that the property of private water companies often escapes taxation, or is taxed lightly, but some tax is generally levied; and the fact is always at hand for use as an argument on the part of the company when lower rates are proposed.

Under municipal ownership a harmonious development of this and other public works is possible. Water-mains may be laid before streets are paved, thus saving the damage and expense of tearing up good pavement to lay water-pipes. The health and police departments may easily work with the water department for the public good, instead of the water company being continually fearful lest the health board declare its water insanitary, and being too often ready to resist efforts to secure a better supply.

Less friction between consumers and purveyor is developed under public than under private ownership; the consumer feeling that the city water department is the servant, but that the water company is its master. This lesser amount of friction makes the introduction of meters sometimes easier under public ownership; although, where these devices are very unpopular, municipal officers are more likely than private companies to yield to the clamor against meters, and defer the introduction of this desirable system of selling water.

Better hours and wages are claimed by some as

one of the great advantages of municipal ownership. While there is doubtless much ground for this claim, it is often true that the higher wages and shorter hours are given as political sops, rather than for any better reason; and that under such conditions the wage-earners may be degraded rather than benefited, while the water is thus made more expensive for the consumers.

There is no reason why a municipality cannot build and operate water-works as cheaply as a company, and it can almost invariably raise the necessary capital at a lower rate of interest. If a municipality does not succeed as well as a company in these particulars, it is due to political favoritism, corruption, incompetency, or negligence on the part of the public officials, more largely than to anything else. If officials capable of any or all of these vices are allowed to get into office, they will be pretty sure to yield to them under any plan that may be devised for supplying the wants of the people. The city official who would enrich himself at public expense through contracts for building or maintaining a municipal water, lighting, or street-railway plant, will not be slow to betray his trust to a private company performing the same service, either through the passing of too liberal franchises, or the failure to enforce those which properly protect the interests of the city.

A company once intrenched behind a franchise

or other public privilege, secured through either political favoritism or bribery, cannot easily be dislodged, owing to the difficulty of proving fraud or corruption. It may therefore go on year after year, reaping a rich harvest of excessive charges, all in apparent legal form. A thieving city council or board of public works may be turned out, though with herculean effort, and its plundering stopped.

Suppose a company is seeking its franchise, and finds that the rates it is willing to accept will bring it $5,000 a year more than those proposed by the city council of nine members. This difference for one year of even a fifteen-year franchise, judiciously distributed among some members of the council, or handed to the leader of the dominant political party, might secure a majority, and mean $70,000 during the life of the franchise. Suppose, instead, that municipal works are constructed. An appropriation cannot be voted in many States until plans and specifications have been prepared. These are liable to very close scrutiny on the part of opponents to the project, and disappointed aspirants for the position of engineer. Then the contract must be let publicly, with hosts, oftentimes, of jealous bidders watching each other and the city officials. Supposing a steal does occur that raises the alleged cost of the works by half. This is not so large an increase in capitalization as many companies effect by stock-watering, while the rate of

interest on the city outlay would be less than on the capitalization of a company. Thus far, then, the city is in a position to charge as low rates as the company possibly can live under. Coming next to operating expenses, there may be some incompetency and some stealing here for a few years on the part of the city officials, and yet the works may be maintained without levying rates in excess of those that would give the company a fair reward on its capital, saving the people the $5,000 a year for fourteen years which the company would have bought from the city council for one year of this excess revenue. If, during the last half of the fourteen-year period, the city government was purified, and the incompetence and stealing, assumed above, stopped, then the public would gain all the more; but under private ownership the company would be too well fortified, through long enjoyment of the higher rates, removal and death of the members of the council that granted the franchise, and the general difficulty of proving fraud, for the consumers to secure the reduction of rates. It would produce its franchise, prove its long and unquestioned enjoyment of the rates fixed in it, and defy proof of fraud in securing the insertion of such rates in the document; and the court would uphold the company. Meanwhile, through the whole life of the franchise, the water consumers would have fumed and fretted over

what they believed were exorbitant rates and unjust regulations; the corrupt council, during the first half of the franchise, would refuse to interpose in behalf of the people in matters of lower rates, purer water, or anything else desired; and, during the last half, the fight for these things would be doubtful, if not hopeless, in result.

It is not my intention to paint all private companies black; I only urge that "the pot must not call the kettle black," that "what is sauce for the goose is sauce for the gander;" and, in general, as is already stated, it is not on methods, but on men, that we must rely for good city government

CONCLUSIONS.

I have endeavored in the foregoing pages to present some of the most salient points relating to water-works as one of several municipal monopolies. I have not attempted to prove that either public or private ownership is the best plan to pursue, but I do not hesitate to say that I believe in municipal ownership as a general practice. I have not compared the cost of water under the two systems; because, without going into the subject in great detail, such a comparison would be very misleading. Water rates, both public and private, are on a most unscientific basis. If water, like gas, were universally sold by meter, the case would

be different; but even then there would be left for consideration how the cost of supplying water is divided between the city, as a whole, and private consumers, and whether low rates for one branch of the service were not offset by high ones for the other. Besides this, it may cost very much more to supply water in one locality than another, without regard to ownership, natural conditions being very important factors.

Certainly we need more business-like city government than we now have, whoever may own the works; and we need more clearly drawn franchises, when works are operated on this plan.

There seems to be no reason why an honest and competent city government cannot build and operate works as cheaply as a company. If it can, then the profit all companies expect to make may go to the consumers, besides which, the other advantages of municipal ownership remain in its favor. If it is urged that city governments are dishonest and incompetent, then I reply that the people must pay the penalty under private ownership as well as public. What benefit is it to the water consumers if a company can operate works at less expense than the city, so long as the difference goes into the treasury of the company instead of resulting in lower rates? Dishonest city governments are not going to force a reduction of the rates of private companies, if, indeed, they could; instead,

they will take a part of the profits in return for allowing the rates to remain at the topmost notch.

When municipalities control private corporations, instead of the reverse, as was recently so well put by Dr. Albert Shaw in the *Independent*, then it will matter far less than now whether we have private or public water-works. Water rates, in those days, will be kept down to a point where they will yield a fair return on capital; and such companies as then exist will not be constantly afraid of "strikes" on the part of self-seeking city and State officials. There must be just treatment on both sides. Meanwhile, we must have municipal reform, and we must also have more light on the much discussed question of ownership of natural monopolies. Private companies, naturally enough, keep their financial figures to themselves; and the book-keeping of both public and private works is often so poor that little can be learned from it when available.

II.

MUNICIPAL ELECTRIC LIGHTING.

MUNICIPAL ELECTRIC LIGHTING.

By JOHN R. COMMONS, A.M.
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In advocating municipal electric lighting, I accept the burden of proof. I agree that government, whether national or local, cannot safely undertake experiments on a large scale. The assumption of new functions must be shown to be not merely desirable in the interests of a few, or adapted to the doctrinaire ideal of a well-rounded form of government, but it must be shown to be necessary and essential for the preservation of important interests affecting the welfare of the entire body of the people. Governments do indeed enter upon experiments, and the assumption of a well-established industry may itself be called an experiment. But in the sense in which I use the word, — the introduction of new modes of manufacture or service, and the creation of new wants among the people, — these are matters involving risks of an incalculable and speculative kind; and this is not

safely the business of government. Private parties should be encouraged to push forward in all the untried fields. If their ventures are unsuccessful, if they are ahead of their times, failure and bankruptcy will affect only them and their immediate dependents. Successors will come in; and if the service in question meets a truly growing need of the people, success and fortune will follow. But if government ventures upon the sea of uncertainty, bankruptcy means the beginning of anarchy. Government does not perish, like the individual or the corporation; and failure on a large scale, if it involves repudiation or oppressive taxation for years to come, produces a popular revulsion, and deep-seated distrust of government itself in all its departments.

A criticism should therefore be made upon those cities which entered upon municipal electric lighting eight or ten years ago. Here was a new agency utterly unknown as a commercial quantity, — new machinery of all degrees of imperfection and uncertainty; cost of operation, depreciation, risks, unsettled; engineering and mechanical requisites on the part of employees quite indefinite; public opinion not yet crystallized through adequate discussion and experience. In the face of all these uncertainties, it is not strange if some cities have incurred debts for fabulously priced machinery which a few years of experience have since dis-

carded, and if the reaction has driven the citizens to the best kind of a bargain they could make with private companies. It is reported that eight or ten towns and cities which had installed municipal plants have abandoned their undertakings, and sold out to private companies at a serious loss. That the number is so small, considering that over three hundred cities and villages are reported to have adopted municipal ownership, certainly speaks well for the industrial ability of our small cities. On the other hand, the fact that these failures have not prevented an astonishing increase in the number of municipal plants indicates some deep-seated causes which are worthy of our attention. In the State of New York alone, the six municipal plants of two years ago are now increased to twelve, and possibly more.

Municipal functions have increased very slowly. Cities have accepted the principle, just as every advocate must also do, that the burden of proof is against the assumption of new functions. Natural lethargy and difficulties in the way of co-operative action have been important checks; but equally or more important has been that wise Anglo-Saxon conservatism which makes sure and impregnable every acquisition in civilization before advancing to new fields. In the matter of electric lighting, only weighty and even vital considerations can push forward the movement for municipal owner-

ship over any extensive range of cities. As far, however, as the experimental character of the industry is concerned, fifteen years of experience and marvelous inventive progress have reduced electric lighting to a system, and made all its parts and details as readily calculable as any of the functions in which cities are now engaged. The rapid growth of cities themselves, with an assured increase of demand for light and power, combined with the perfection of the mechanical equipment and the fairly reasonable competition between producers of the same, have removed for the present the weight of any criticism similar to that which might attach to those cities which ventured upon this field in the early days of the industry. The questions which now present themselves to cities considering the proposed operation of municipal plants are therefore greatly simplified by the elimination of these strictly mechanical questions. The new problems are of a quite different character. They may be briefly summarized under the headings — improved service, diffusion of use among the people, stimulation of industry, and purification of politics. These apply to all industries requiring a municipal franchise, and, with the growth of a city, any one or all of them may gather such increasing weight that the city is compelled to assume the operation of the industry in question. Streets and alleys have, of course, long since been

municipalized; and it would be utterly intolerable, even in small villages, if vehicles and horses were subjected to tolls at various street intersections. The sewerage system comes next in urgency. Only three cities in the United States have private-owned systems of sewers. This service must be made universal, and must be of the highest quality for both poor and rich sections. It, therefore, like the streets, has been municipalized and made entirely free of tolls. New Orleans, with its private sewers, is suffering, not only from inadequate sewer service, but from corrupt politics growing out of such service. Water-works follow sewers in the extent of municipalization.

In electric lighting the process of municipalization is as yet mainly in the small places. While but three cities of over 100,000 population, according to the census of 1890, have municipal electric plants, it appears from the list of 302 municipal plants reported by the American Electrical Directory for 1898, in cities for which population statistics can be found, that 122 are owned by cities of less than 2,500 population, 89 by cities of 2,500 to 5,000 population, making 70 per cent of the total number owned by cities of less than 5,000 population; 51 are owned by cities of 5,000 to 10,000, 20 by cities of 10,000 to 20,000, 16 by cities of 20,000 to 50,000, 3 by cities of 50,000 to 500,000, and one by a city of 1,500,000. The

fact that the preponderance lies so largely on the side of the small cities and villages is sometimes advanced as showing that large cities are not competent to undertake this function. While such a conclusion is, of course, not logically warranted, there are patent reasons why municipal ownership should achieve its first success in the smaller municipalities. Here government lies close to the people. The officials are known to every one. They cannot retire under the shield of their friends and party councilors. They are accessible to the personal complaints of every one. In large cities newspapers do the complaining, and everybody discounts these as the organs of partisanship or corporate jobbery. The people do not come in contact with their officials. But it is otherwise in the small cities, and the result is a constant effort on the part of officials to meet the demand for efficiency and economy.

The voting constituency, too, has a preponderance of small property-owners, the thrifty and independent middle class, who have always been the bulwark of popular government. There are no multi-millionaires on the one hand, and no overwhelming array of wage-workers dependent upon them, upon the other. This relieves the community both from the machinations of a few rich men who in every city use their power to exploit their neighbors, and whose interests are, therefore,

against honest government; and also from the blind struggles of the working-classes to secure through politics those advantages and liberties which they are unable to obtain in industry. This makes both the administration of the civil service a simple matter, and the hours and wages of labor in public employment conform to the most exacting conditions that obtain in private industry.

On page 62 and 63 is a table showing for street plants, in large and small cities, the varying costs of labor per arc light for public and private plants. By comparing sections 2 and 4, it will be seen that small places with long hours of work show a range of labor cost from $17.16 per arc to $35.12, while large cities with short hours show a range of $23.46 to $52.21.

It will be seen that the labor cost in the New York City private plants is $3.88 per arc less than in Detroit, and $16.71 less than in Chicago. This difference is accounted for in two ways: first, by the much larger output per station in New York City; second, the higher wages, shorter hours, and, consequently, larger staff of employees, in the public plants. In the larger cities, on the other hand, the larger output and larger units in boilers, engines, and dynamos would tend to reduce the labor cost per unit of product. The case of Allegheny, with its extremely low labor cost notwithstanding short hours, is noteworthy.

TABLE I. Cost of Labor per Arc Light.

1. Labor Employed, 72–84 Hours per Week — with Water-Works Plant.

	ARCS.	PER YEAR.	PER LAMP-HOUR.	AUTHORITIES.[1]
Dunkirk, N.Y.	75–2,000	*a* $12.18 *b* $12.95	*a* $.0039 *b* $.0044	*a* Commons, 1897. *b* Foster.
Batavia, N.Y.	103–2,000	19.21	.0056	Commons, 1897.
Herkimer, N.Y.	55–2,000	28.58	.0097	Commons, 1896.
Marshalltown, Ia.	64–2,000	9.19	. . . .	Commons, from Mayor's
Lewiston, Me.	100–2,000	22.00	.0079	Foster. [figures.
Bangor, Me.	150–2,000	24.00	. . . .	Parsons.
Goshen, Ind.	40–2,000	31.00	. . . .	Parsons.
Wheeling, W. Va. (with gas)	. . .	*c* 37.00 *a* 26.98	. . . .	*c* Parsons. *a* Commons, 1897

2. Labor Employed, 60–84 Hours per Week — Street Plants Alone.

	ARCS.	PER YEAR.	PER LAMP-HOUR.	AUTHORITIES.
Watervliet, N.Y.	103–2,000	*a* $25.00. *b* $24.44. *c* $26.61	$.0062	*a* Parsons. *b* Foster. *c* Commons, 1897.
Easton, Pa.	108–2,000	*a* 22.76 *b* 28.00	.0075	*a* Foster. *b* Parsons.
Elgin, Ill.	98–2,000	32.50	. . . .	Foster.
Bay City, Mich.	103–2,000	*a* 17.16 *b* 24.00	.0071	*a* Foster. *b* Parsons.
Aurora, Ill.	179–2,000	28.50	. . . .	Parsons.
St. Joseph, Mo.	253–2,000	27.50	. . . .	Parsons.
Fairfield, Ia.	14–2,000	*a* 26.00 *b* 12.08	.0178	*a* Parsons. *b* Foster.
Painesville, O.	70–2,000	20.00	. . . .	Parsons.
Little Rock, Ark.	*a* 132–2,000 *b* 210–2,000	*a* 35.12 *b* 21.00	.0162	*a* Foster. *b* Parsons.
Topeka, Kan.	184–2,000	34.00	. . . .	Parsons.

[1] See comments, pp. 67, 68, *infra*.

TABLE I. *Continued.* **Public Plants with Commercial Lighting.**

3. Labor Employed, 60–72 Hours per Week.

	ARCS.	PER YEAR.	PER LAMP-HOUR.	AUTHORITIES.
Hannibal, Mo. .	350–2,000	$14.89	$.0068	Foster.
Luverne, Minn. .	124–2,000	8.71	.0048	Foster.
Farmville, Va. .	63–2,000	30.02	.0139	Foster.
Madison, Ga. . .	73–2,000	28.51	.0132	Foster.
St. Clairsville, O.	*a* 105–2,000 *b* 80–2,000	*a* 9.25 *b* 15.97	.0070	*a* Parsons. *b* Foster.
Westfield, N.Y. .	110–2,000	21.08	.0124	Foster.

4. Labor Employed, 48 Hours per Week—Street Plants Alone.

	ARCS.	PER YEAR.	PER LAMP-HOUR.	AUTHORITIES.
Chicago, Ill. . .	1,100–2,000	*a*$52.21 *b*$52.20	$.0131	*a* Foster. *b* Parsons.
Detroit, Mich. .	1,700–2,000	38.38	.0101	*c* Commons, 1897
Allegheny, Pa. .	*b* 620–2,000 *c* 1,235–2,000	*b* 27.00 23.46	.0058	*b* Parsons. *c* Commons, 1897.

5. Private Plants.

	PER YEAR.	AUTHORITIES.
N. Y. City Average . . .	$34.50	Parsons.
N. Y. State Average . . .	19.50	Computed from Census, 1890.

It should be said, that, as an offset to the low wages and long hours in smaller places, the work is much easier than in large plants. When one fireman and one engineer run a small plant of 100 arcs in conjunction with water-works, probably less than one-half their time is employed in actual work. The cost of living, too, is much less than in cities. Consequently the urgency for both high wages and short hours is relatively less.

A very important advantage in a small town is the ability often to combine the electric-lighting plant with the water-works. Mr. M. J. Francisco, of Rutland, Vt., in his pamphlet, "Municipal Ownership, Its Fallacy,"[1] insists on the duplicity of municipal officials who charge the salaries of firemen, engineers, and superintendents of electric works to the water department. In all such cases he forthwith corrects the dishonest officials by charging all the wages and salaries in the water-works to the electric-light department. The relative worth of the two methods may be judged from the following typical cases.

The village of Batavia, N.Y., owning and operating its water-works system, decided, in 1893, to add an electric-lighting outfit to the plant. An addition was made to the water-works building for the electric machinery, and a new boiler was erected. Two engineers, at $65.75 per month

[1] Published by the author, Rutland, Vt., 1895.

each, had been all the force needed for the water-works. For electric lighting there were added one electrician at $65, one trimmer at $45, and one fireman at $45, and the engineers' salaries were increased $5 each per month; making the total additions $165 per month, $1,980 per year, or $19.22 per arc lamp per year. The combination with the water-works saves the salary of one engineer, $65 per month, less extra pay to water-works engineers.

The city of Dunkirk, N.Y., installed an electric plant with its water-works in 1888. The water-works staff had been: two engineers, $70 each, two firemen, $50 each, superintendent and assistants, $165; total, $405 per month, or, with $350 per year for clerk and collector, $5,210 per year. When the electric plant was added, with an additional boiler, a trimmer was employed at $55, and the firemen were given $5 extra pay; total, $65 per month, which, with $133.62 extra labor on lines, made the total labor cost $913.62 in 1897, or $12.18 per arc. As a matter of fact, the Dunkirk labor cost is only $133.62 a year more for both water supply and electric lights than it had been for water supply alone; because one superintendent at $100 a month now does the work formerly done by superintendent and assistants at $165 per month, and the total labor cost for both departments in 1897, including extra labor, was $5,343.62 against $5,210 for water alone before 1888. But this saving of $65 per year in the superintendent's force has been properly credited to the water department, and the extra expense for electric lighting has been figured at $913.62, as above.

In considering the cost of operation in these plants connected with water-works, the conscientious defender of the higher charges of private plants is justified in pointing out that they cannot

be taken as a fair basis of comparison with private plants operated alone. He, however, would hardly go as far as Francisco, and claim that their operating accounts were dishonestly compiled, nor would he inflate the electric account by means of the water account. The officials in these cities have prepared these statements with a definite purpose, namely, to show to other cities having water-works plants the very slight additional expense that they would incur by adding an electric plant to their water plant. From this point of view their statements are straightforward and correct. They demonstrate beyond question the decided advantage that every small city with a water plant has in espousing public ownership and operation of electric works, provided the two can be incorporated in one establishment.

There are many small villages now enjoying electric lighting which would probably not have secured this privilege had not the people as a whole, in their corporate capacity, undertaken it.[1]

The question at issue is not one between public and private ownership, but whether they shall have

[1] Mr. Foster, in reviewing the list of thirty-four towns whose costs he has tabulated, and showing that thirteen have less than 3,000 inhabitants, five have between 3,000 and 5,000, four between 5,000 and 10,000, seven between 10,000 and 20,000, four between 20,000 and 30,000, and only one is of the first class, or over 1,000,000, remarks that "somewhat over half the number are places where it is doubtful if a commercial or private plant could be made to pay under any circumstances."

electric lighting at all. If they have made a success of it, and have produced light at a cost no greater than other cities are paying private companies, this is certainly to the credit of the principle of municipal ownership under such circumstances, if under no other.

PREVIOUS INVESTIGATIONS.

In attempting to make a comparison of the actual operations of municipal and private ownership of electric-lighting plants in the United States, that shall be at the same time fairly exhaustive and fairly accurate, one is confronted with the magnitude and expense of the undertaking. Nothing less than a governmental bureau can adequately undertake so large an inquiry. It must, therefore, be to the greatest satisfaction of the public to know that the United States Department of Labor, under the supervision of Carroll D. Wright, has undertaken exactly such an investigation. In view of this prospective mine of information, I shall not undertake to consider the whole field, but shall devote my attention to a few municipal plants which I have been able carefully to study personally, and to a critical examination of some of the more important statistical inquiries that have been made hitherto. These are three in number: that of Mr. H. A. Foster, that of Mr. M. J. Francisco, and that of Professor Frank Parsons.

Mr. Horatio A. Foster was employed by the *Electrical Engineer* to report on an inquiry into municipal electric lighting, undertaken by that journal. His report is published in the issue of Sept. 5, 1894. Mr. Foster is an electrical expert and accountant of high standing, who was employed on the census of 1890; and his report is undoubtedly the ablest and most candid of all the investigations made from the standpoint of those who defend private companies. Prof. Frank Parsons, the results of whose extensive investigations were published in the *Arena* during the latter half of 1895, gives the most painstaking and exhaustive statistical analysis of electric lighting yet made from the standpoint of those who favor municipal operation. Mr. Francisco's pamphlet, "Municipal Ownership, Its Fallacy," was published in 1895; so that the three writers base their calculations on conditions as they existed in 1893–1895.

Foster and Francisco are antagonistic to municipal ownership, while Parsons favors the proposition.

I have tabulated (Table II., pp. 70–71) the results obtained by these writers as to the cost per lamp-hour and the cost per year of arc lighting, in all cases where two or more estimates for the same city are given. These reports are not all made upon the same unit as a basis, and I have been compelled to make two sets of computations in order to bring them to the same basis for comparison. Foster and Francisco do not state the cost per year, but they state the cost per lamp-hour and the number of hours per year; and I have computed the cost per year. Parsons gives only the cost per year, and not by lamp-hour. On a number of plants

he gives only the operating expense, and not the interest and depreciation; and for these plants I have added a third column, where I have taken his operating expense, and added to it a computation of 4 per cent interest and 5 per cent depreciation on the total investment (not *debt*, as he prefers). A final column is added, giving for certain of the municipalities estimates based on statistical principles developed in the course of this chapter, but for the year 1897 instead of 1894.

These three writers have been selected because the opponents and the advocates of municipal ownership throughout the country seem to rely upon them for their data and arguments in maintaining their respective opinions. It will be seen that they reach the most contradictory results. Francisco far exceeds Foster in his high estimates of the cost of municipal operation; and Parsons, while his estimates are materially lower than either, is yet, in such cases as I have been able to examine, above the estimates made by the municipal officials themselves, and generally above my own estimates.

For comparison with private companies, Table III. has been compiled, showing the highest and lowest and average prices per year paid by cities to private companies for street-lighting. The figures are taken from Bulletin 4112, issued by the General Electric Company, Schenectady, N.Y., and were in effect during 1896–1897.

TABLE II.

Comparative Estimate of Net Cost to City for Street Lamps — Francisco, Foster, Parsons, 1893–1895.

Cities.	Candle-Power.	Hours per Year.		Cost per Lamp-Hour.		Cost per Lamp-Year.					
								Parsons.			
		Francisco.	Foster.	Francisco.	Foster.	Francisco (Computed).	Foster (Computed).	Operating Expense.	Operating Expense. Interest on Debt, Depreciation 5%.	Computed Interest 4% and Depreciation 5% on Total Investment.	Commons, 1895.
Alameda, Cal.	2000	..	1420	.1458	.124	..	$178.80	$120.00	..	$162.30	..
Allegheny, Pa.	2000	4000	..	.0230	..	$92.00	..	64.00	$79.00	..	$62.03
Arlington, Minn.	1200	1460	2000	.021	.0502	306.60	100.40	40.00	..	56.50	..
Aurora, Ill.	[1] w. w.	2622	2426	.0447	.0371	117.20	90.37	53.50	61.00	..	..
Bangor, Me.	w. w.	3750	..	.0278	..	104.25	..	34.00	..	54.70	35.00 [3]
Bay City, Mich.	2000	..	2418	.0376	.0308	..	74.47	50.00	60.00	..	..
Braintree, Mass.	1200	1912	..	.0517	..	98.85	..	47.50	69.50	..	..
Bloomington, Ill.	w. w.	2247	..	.0545	..	122.46	..	50.00	66.50	..	59.21 [3]
Bowling Green, Ky.	w. w.	2190	..	.0498	..	109.04	..	50.00	60.00	..	..
Chicago, Ill.	2000	..	3950	..	.043	167.78	169.85	96.67	..	152.47	..
Council Grove, Kan.	1200	1875	2000	.0779	..	146.06	..	O [2]	..	27.00	..
Crawfordsville, Ind.	2000	2190	..	.0671	..	146.94	..	25.50	..	41.25	46.91 [5]
Crete, Neb.	1200	..	1590	..	.0805	..	127.99	O [2]	..	17.10	..
Decatur, Ill.	w. w.	1460	..	.0752	..	109.79	..	50.00	..	..	..
Dunkirk, N.Y.	w. w.	3000	3945	.0278	.0273	83.40	80.39	46.00	59.25	..	49.49
Easton, Pa.	2000	3219	3031	.0445	.0413	143.24	125.80	85.00	103.20	..	..
Elgin, Ill.	2000	2190	2500	.0546	.04	128.33	100.00	43.00	55.50	..	45.93 [3]
Fairfield, Ia.	w. w.	2190	1680	.07	.0765	153.30	128.57	70.00	85.50	..	..
Farmville, Va.	2000	..	2160	..	.0424	..	91.58	340.00 [2]	..	..	..
Frederick, Md.	2000	2190	2160	.0435	.0394	95.26	85.10	54.00	65.50	..	65.78 [3]
Fredonia, N.Y.	2000	1460	..	.0524	..	76.50	..	48.50	58.50	..	..

Galion, Ohio	2000	2190	..	.0511	..	111.90	..	40.00	..	56.15	..
Galveston, Tex.	2000	2190	2700	.0557	.0318	121.98	85.86	70.00	..	85.30	83.80 [3]
Goshen, Ind. w. w.	2000	2190	2168	.0513	.0480	112.34	104.64	68.00	81.75	..	..
Hannibal, Mo.	2000	2450	2190	.0540	.0271	132.30	59.34	..	..	..	..
Hudson, Wis.	1200	..	2208	..	.0221	..	48.76	36.00	42.00	..	..
Jamestown, N.Y.	1200	2190	..	.0577	..	126.36	..	21.50	32.00	..	..
Lewiston, Me. w. w.	2000	3000	2785	.0291	.0257	87.30	71.51	43.00	..	57.40	..
Little Rock, Ark.	2000	..	2168	..	.0503	..	109.05	42.00	50.00	..	..
Luverne, Minn.	2000	..	1815	..	.0254	..	46.10	520.00 [2]	..	..	..
Marietta, Ohio w. w.	2000	2190	..	.0589	.05	97.31	..	33.75	42.00	..	..
Marshalltown, Ia. w. w.	2000	1460	1950	.0335	.0226	48.91	44.07	18.50	27.50	..	25.57
Martinsville, Ind. w. w.	2000	1460	..	.0464	..	67.74	33.00	41.33	..	..	..
Metropolis, Ill. w. w.	2000	2190	1452	.0435	..	95.26	..	27.50 [2]	..	33.80	..
Miamisburg, O.	2000	2190	..	.0434	..	95.04	..	52.00	..	60.00	..
North East, Pa.	2000	1875	..	.0368	..	72.39	..	50.00	53.33	..	..
Painesville, Ohio	2000	1875	1838	.0390	..	73.12	72.60	44.25	53.50	..	50.37 [3]
Paris, Ill. w. w.	2000	1875	..	.0523	..	97.06	..	40.00	45.50	..	..
Portsmouth, Ohio w. w.	2000	2190	..	.0481	..	117.33	..	39.00	49.00	..	..
Shelby, Ohio.	2000	2190	..	.0562	..	123.16	..	56.00	..	71.30	..
Savannah, Mo.	1200	1460	..	.10	..	146.00	..	O [2]	..	14.85	..
Statesville, N.C.	2000	1875	..	.0355	..	66.56	..	40.00	..	53.50	..
St. Clairsville, Ohio	2000	3750	2282	.0269	.0232	100.87	52.94	28.00	..	53.50	..
St. Peters, Minn. w. w.	2000	1460	..	.0757	..	110.52	..	O [2]	..	7.20	..
South Norwalk, Conn.	1500	..	2255	..	.0285	90.89	63.86	42.33	61.00	..	53.56 [4]
Topeka, Kan.	2000	2500	.0430	..	..	107.56	74.00	87.00	..	..	..
West Troy, N.Y.	2000	3750	3950	.0306	.0241	114.75	95.19	61.00	75.00	..	73.14
Ypsilanti, Mich. w. w.	2000	1460	..	.0664	..	96.94	..	36.00	..	54.49	..

[1] Electric works operated in connection with waterworks. [2] Profit on entire plant.

[3] Based on bulletin of the League of American Municipalities, March, 1898, with computations for interest 4%, and depreciation 3%, on total cost of plant.

[4] Official — includes interest on debt, and depreciation 3½ per cent.

[5] Based on Report of South Norwalk Committee, February, 1897, with computations for interest and depreciation where not given in the report.

TABLE III. Highest, Lowest, and Average Prices per Year Paid by Cities to Private Companies, by States.

State.	City.	C. P.	No. Hours.	Per Year.	Per Lamp-Hour	State.	City.	C. P.	No. Hours.	Per Year.	Per Lamp-Hour
California . .	San Francisco .	2000	4000	$201.00	.05	Minnesota . .	Minneapolis . .	2000	4000	$140.00	.035
	San Bernardino,	2000	4000	78.00	.02		Spring Valley .	1200	1640	72.00	.044
	Average . .	. .	2885	$119.68	.045		Average . .	. .	2179	$102.00	.047
Connecticut . .	Meriden . . .	2000	3460	$110.00	.032	Missouri . . .	Jefferson . . .	2000	4000	$123.00	.031
	Stafford Springs,	1200	1460	62.50	.043		Sedalia	2000	4000	63.50	.016
	Average . .	. .	2730	$86.02	.035		Average . .	. .	2917	$83.00	.032
Illinois	Joliet	2000	4000	$95.00	.024	Nebraska . . .	Grand Island .	2000	4000	$144.00	.036
	Lincoln	2000	4000	70.00	.018		Plattsmouth . .	1200	2179	96.00	.044
	Average . .	. .	2789	$77.02	.031		Average . .	. .	2891	$109.50	.041
Indiana	Fort Wayne . .	2000	2250	$120.00	.053	New Jersey . .	Camden . . .	2000	3835	$138.00	.036
	Auburn	1200	1825	60.00	.033		Bridgeton . . .	1200	2852	81.00	.028
	Average . .	. .	2682	$79.33	.033		Average . .	. .	3615	$105.36	.032
Iowa	Des Moines . .	2000	4000	$126.00	.032	New York . . .	New York City .	1200	4000	$182.50	.045
	Ottumwa . . .	2000	4000	80.00	.02		Phœnix	1200	4000	45.00	.011
	Average . .	. .	2870	$85.73	.032		Average . .	. .	3387	$93.61	.028

KANSAS	Hutchinson	2000	4000	$144.00	.036
	McPherson	2000	1220	60.00	.049
	Average		2734	$97.19	.040
KENTUCKY	Mount Sterling	1200	2179	$100.00	.046
	Cattellsburg	2000	4000	66.44	.016
	Average		3063	$88.07	.032
MAINE	Rumford Falls	1200	4000	$90.00	.023
	Auburn	2000	2179	50.00	.023
	Average		2629	$67.50	.031
MASSACHUSETTS,	Fall River	2000	4000	$156.12	.039
	Northampton	1200	2179	67.50	.031
	Average		2705	$93.81	.037
MICHIGAN	Negaunee	2000	4000	$108.00	.027
	Battle Creek	2000	1825	57.00	.031
	Average		3465	$77.04	.024
OHIO	Dayton	2000	4000	$100.00	.025
	Nelsonville	1200	4000	60.00	.015
	Average				
PENNSYLVANIA	Franklin	1200	3650	55.55	.016
	Germantown	2000	4000	$135.00	.034
	Average		3931	$85.75	.022
TEXAS	Paris	2000	4000	$96.00	.024
	San Antonio	2000	2179	127.75	.059
	Average		3472	$108.75	.037
VERMONT	Brattleboro	2000	4000	$150.00	.038
	Middlebury	2000	1650	52.00	.032
	Average		2254	$84.67	.039
WISCONSIN	Superior	2000	4000	$146.00	.037
	Racine	1200	1550	58.00	.037
	Average		3057	$81.16	.030
Total average for 46 States			3326	$101.18	.034

Table II. presents two bases of comparison; namely, the cost per lamp-year, and the cost per lamp-hour. Francisco and other writers attach especial value to a third basis, that of the candle-power per hour furnished for one cent. This, of course, is obtained by dividing the rated candle-power of the lamp by the cost per lamp-hour. Francisco has compiled a table, which has received wide newspaper circulation, and has appeared in the reports of various local investigating committees, comparing the cost per hour and the candle-power per hour furnished for one cent in municipal plants with those where contract is made with a private company. The table is given on the opposite page.

Parsons rejects the lamp-hour basis as deceptive, and with it, of course, the candle-power-per-hour-for-one-cent basis. Indeed, as employed by Francisco in the accompanying table, the comparison is utterly unreliable. Assuming for the present that he has correctly calculated the cost per year, there are many varying elements which must be corrected before we can compare the lamp-hour or candle-power costs as he has done. There, are first, the relative costs of coal and fuel between the two places compared. A 2000 c. p. arc light requires 4 to 10 tons of coal per year; and coal varies from an average of $1.36 per ton in Georgia and $1.56 in Pennsylvania, to $4.05 in Massachusetts, $5.00

TABLE IV. "A Comparison of the Cost between Municipal Plants and Private Companies."

FRANCISCO.

Cost of Lights Where Plant is owned by the Municipality.	Cost Per Hour.	Candle-Power per Hr. furnished for 1 c.	Cost of Lights Where Contract is made with Private Company.	Cost Per Hour.	Candle-Power per Hr. furnished for 1 c.
Alameda, Cal. . .	.1458	137	San Diego, Cal. . .	.0874	229
Aurora, Ill. . . .	.0447	447	Joliet, Ill.	.0266	751
Bay City, Mich. .	.376	531	Jackson, Mich. . .	.232	862
Bloomington, Ill. .	.545	366	Galesburg, Ill. . .	.532	375
Chicago, Ill. . . .	.519	385	Chicago, Ill. . . .	.0437	451
Crawfordsville, Ind.	.671	298	Peru, Ind.	.0266	884
Danvers, Mass. .	.052	433	Lynn, Mass. . . .	.0365	547
Dunkirk, N.Y. . .	.278	718	Auburn, N.Y. . . .	.253	787
Easton, Pa. . . .	.445	449	Harrisburg, Pa. . .	.240	750
Elgin, Ill. . . .	.586	341	Danville, Ill. . . .	.0365	547
Fairfield, Iowa. .	.07	285	Burlington, Iowa .	.454	440
Galion, Ohio . .	.0511	391	Circleville, Ohio . .	.0400	500
Grand Ledge, Mich.	.1100	181	Grand Rapids, Mich.	.0360	555
Hannibal, Mo. . .	.0540	370	St. Louis, Mo. . . .	.0200	1000
Herkimer, N.Y. .	.0572	349	Batavia, N.Y. . . .	.0240	833
Madison, Ind. . .	.696	287	Evansville, Ind. . .	.545	366
Madison, N.J. . .	.678	294	Camden, N.J. . .	.0371	539
Marietta, Ohio . .	.0589	339	Columbus, Ohio . .	.0365	547
Bangor, Me. . . .	.0278	719	Skowhegan, Me. . .	.0187	802
S. Norwalk, Conn.	.0571	280	Bridgeport, Conn. .	.0368	326
Council Grove, Kan.	.0779	154	Atchison, Kan. . .	.0384	312
Ypsilanti, Mich. .	.0664	298	Lowell, Mich. . . .	.0533	375
Frederick, Md. . .	.0435	495	Baltimore, Md. . .	.0319	626
Galveston, Tex. .	.0557	359	Dallas, Tex. . . .	.0253	787
St. Peters, Minn. .	.0757	264	Minneapolis, Minn. .	.0648	309
Little Rock, Ark. .	.0541	369	Arkansas City, Ark.	.0224	937
Portland, Ore. . .	.0348	574	Salem, Ore. . . .	.0320	625
Statesville, N.C. .	.0355	338	Charlotte, N.C. . .	.0325	375
Staunton, Va. . .	.0497	241	Parkersburg, Va. .	.0256	781

"In the above table, places from the same State are compared, and working as near as possible under the same conditions. Where water-power is used by a city, the private plant selected is also water-power."

in Maine, and $7.00 in California.[1] Francisco has attempted to eliminate this variant by comparing plants in the same State, which is a fairly adequate correction. But he has not eliminated two other variants which are equally disturbing; namely, the differences in the relative costs of producing a 1,200 c. p. light and a 2,000 c. p., and in the relative costs of running the lights on short schedules compared with the all-night schedule. Only in case the cost of production varies in exactly the same ratio as both the rated candle-power of the lamps and the number of hours burned per year, will it follow that lamp-hour and candle-power hour costs for different lights and different schedules can be directly compared with each other. Now, as a matter of fact, private companies do not charge for light in proportion to the rated candle-power or the schedule of hours.

CHARGES MADE BY PRIVATE COMPANIES FOR DIFFERENT CANDLE-POWER ARCS AND DIFFERENT SCHEDULES OF HOURS.

Comparing first the sub-arc (1,200 c. p.) with the full arc (2000 c. p.), Parsons estimates the cost of producing a sub-arc at $\frac{1}{7}$, or 14 per cent, less than a full arc, agreeing with Buckley's[2] figures of lamp-hour costs, which show (by computation) that the sub-arc costs 83 to 90 per cent of the cost of the full arc.

[1] Bulletin 4112, General Electric Company, Schenectady N.Y.

[2] Buckley, W. J., "Electric Lighting Plants," Chicago, 1894.

A compilation made by a committee of the American Society of Municipal Improvements in 1896 showed that in 14 States the average price by contract for sub-arcs ($74.67) was 80 per cent of the price in 31 States for full arcs ($94.21). Taking the 13 States for which averages are given on both lamps, I have compiled Table V., which shows a range in price from 42 per cent in Nebraska to 120 per cent in New York, and an average of 76 per cent for the sub-arc compared with the full arc.

TABLE V.

Average Prices for Full Arcs and Sub-Arcs in Thirteen States.

	2,000 C. P.	1,200 C. P.	PER CENT.
Connecticut	$86.60	$86.20	100
Florida	90.00	60.00	66
Illinois	69.07	36.00	51
Indiana	69.10	64.25	92
Massachusetts	148.80	90.60	61
Michigan	81.80	67.50	83
Missouri	75.10	37.78	50
Nebraska	109.33	44.28	42
New Hampshire	99.00	75.00	76
New York	83.10	100.00	120
Texas	100.00	74.16	74
Vermont	78.00	65.00	86
Wisconsin	93.00	76.25	82
Average	. . .	. . .	76

Superintendent Hunter of the department of Public Lighting of Allegheny estimates about the same difference between the two. He considers that where a private company furnishes light, and where coal is $1.00 per ton, as at Allegheny, a fair price for 4,000 hours' service is $80.00 per year for 2,000 c. p., and $60.00 for 1,200 c. p. arc lamps, a difference of 25 per cent.

If we accept the average of the committee's report, or

the estimate of Hunter, as approximate, we shall have the following corrections to make in order to reduce the two grades of lamps to a common basis for comparison: A sub-arc furnishes $\frac{2}{5}$ less c. p. than a full arc, consumes $\frac{1}{3}$ less energy (325 watts against 480 watts), and costs $\frac{1}{4}$ less per year or hour. Therefore, to compute the amount of candle-power per hour furnished for 1 cent by a sub-arc, deduct $\frac{1}{5}$ from that furnished by a full arc, or to compute for a full arc add $\frac{1}{4}$ to that furnished by a sub-arc, as explained by the following table: —

TABLE VI.

Rated candle-power	2,000 C. P.	1,200 C. P.
Cost per year, 4,000 hours . . .	$80.00	$60.00
Cost per hour, in cents	.020	.015
C. P. per hour for 1 cent	1000.	800.
To reduce to common basis of cost,	Deduct $\frac{1}{5}$	Add $\frac{1}{4}$.

TABLE VII. Conventional Schedules of Hours' Service.

	General Electric Company.	Francisco.	Foster.
All every night	4,000	3,750	3,950
All-dark nights	3,680	. .	. .
4 o'clock	3,460	. .	. .
3 o'clock	2,645	. .	. .
1 o'clock	2,190	. .	. .
Moonlight	2,179	2,190 to 2,622	2,160 to 2,190
Dark nights to 1 o'clock .	1,980	. . . .	. . . .
Midnight	1,825	1,875	1,838 to 2,000
Moonlight to 12.30 . . .	1,815	. .	. .
12.30, 26 nights	1,720	. .	. .
Moonlight to 1	1,550	. .	. .
Every night till 11 . . .	1,460	. .	. .
Moonlight–Midnight . .	1,220	1,460	. .

In attempting to reduce the different schedules of hours to a common basis of cost, we are met by two obstacles.

Private owners seldom report the actual number of hours per year, but give in its place conventional terms, such as "all-night," "moonlight," etc.; and various writers attach widely different values to these terms. Table VII. (p. 78.) shows these variations, as stated or inferred from the compilations of the General Electric Company, Francisco, and Foster.

For our present purposes I shall group these schedules under four divisions on the basis of 4,000 hours for all-night service.

TABLE VIII. Standard Schedules of Hours' Service.

	Standard Schedules.	Less than All-Night.	Schedules included in Standard.	
	Hours per Year.		Hours per Year.	Hours per Night.
All-night	4,000	. .	3,000 to 4,000	9 to 11
Moonlight	2,400	$\frac{2}{5}$	2,150 to 3,000	6 to 7
Midnight	2,000	$\frac{1}{2}$	1,800 to 2,150	5 to 6
Midnight-Moonlight .	1,600	$\frac{3}{5}$	1,200 to 1,800	$3\frac{1}{2}$ to 5

Beginning with the moonlight schedules, I have computed, in Table IX., for the seven cities in the United States which, according to the bulletin of the General Electric Company, have both all-night and moonlight schedules, the differences between the prices paid for the two schedules in percentages of the all-night schedules. Table IX. shows that for the moonlight schedules, furnishing about $\frac{2}{5}$ less candle-power per year, the average contract price is but $\frac{1}{5}$ less per year than for the all-night schedules. Parsons estimates the cost of the moonlight schedule at $\frac{1}{9}$ less (p. 484), but his moonlight schedule is 8 hours instead of 6 to 7; while a computation of Buckley's figures for a 6-hour compared with a 10-hour schedule gives $\frac{1}{6}$ less.[1] The lamp-hour

[1] See Buckley, "Electric Lighting Plants," Chicago, 1894.

TABLE IX. Comparison of All-Night and Moonlight Prices by Contract, — 4,000 and 2,179 hours.

	Price per Year.		Per Cent.	Price per Hour.		Per Cent.	C. P. per Hour for 1 c.		Per Cent.
	All-night.	Moon.	Less.	All-night.	Moon.	More.	All-night.	Moon.	Less.
Lincoln, Ill. 2,000	$ 70.00	$ 60.00	14	$.018	$.028	55	1,140	725	36
Davenport, Ia. 2,000	85.00	56.00	34	.021	.026	24	940	778	18
Des Moines, Ia. 2,000	126.00	96.00	24	.032	.044	37	635	453	29
Minneapolis 2,000	140.00	115.00	18	.035	.053	51	570	378	34
Canton, O. 2,000	87.50	62.50	29	.022	.029	31	914	696	24
Malden, Mass. 1,200	105.00	90.00	15	.026	.041	42	457	290	39
Northampton, Mass. 1,200	86.25	67.50	22	.022	.031	41	557	388	30
Average	97.11	78.14	20			40			30

price for these 7 cities is 40 per cent higher. Buckley's estimate is 37 per cent. The c. p. for one cent is 30 per cent less. We may safely place the lamp-hour cost of the moonlight schedule in general at $\frac{1}{3}$ higher (33$\frac{1}{3}$ per cent) than that of the all-night schedule, and this would give the c. p. for one cent at $\frac{1}{4}$ less. The following scheme will show the computations necessary to secure a common basis of cost: —

TABLE X.

	To Compare All-night with Moonlight Schedule.	To Compare Moonlight with All-night Schedule.
Cost or price per year,	Deduct $\frac{1}{4}$	Add $\frac{1}{4}$
Lamp-hour price . .	Add $\frac{1}{3}$	Deduct $\frac{1}{4}$
C. P. for one cent . .	Deduct $\frac{1}{4}$	Add $\frac{1}{3}$

The following calculation for a typical case will illustrate the scheme: —

TABLE XI. Comparison of Schedules for 2,000 C. P. Lamp.

	Price per Year.	Price per Hour.	C. P. for 1 Cent.
All-night, 4,000 hours. . . .	$100.00	$.025	800
Moonlight, 2,400 hours . . .	80.00	.033+	600
To reduce moonlight to all-night basis	Add $\frac{1}{4}$	Deduct $\frac{1}{4}$	Add $\frac{1}{3}$

Three cities having both midnight and all-night schedules (Table XII.) show that the contract price for the former is $\frac{1}{5}$ less than for the latter. Parsons makes it $\frac{1}{6}$ less, but his midnight schedule is 6 to 7 hours instead of 5 to 6. Computations based on Buckley's 5- and 10-hour schedules give $\frac{1}{4}$ less for the former. These three cities show the lamp-hour price to be 78 per cent higher. Buckley's figures are 50 per cent higher for 2,000 c. p., and 43 per cent more for 1,200 c. p. The data here are conflicting, but we may accept

Buckley's estimates. We shall then have the following scheme for correcting comparisons of midnight and all-night schedules (Table XIII.):—

TABLE XII. Comparison of All-Night and Midnight Prices by Contract, 4,000 and 2,000 Hours.

	Price Per Year.		Per Cent Less.	Price Per Hour.		Per Cent Higher.	C. P. for 1 c.		Per Cent Less.
	All-night.	Mid-night.		All-night.	Mid-night.		All-night.	Mid-night.	
South Bend, Ind., 2,000,	$90.00	$70.00	22	$.023	$.038	66	890	522	70
Battle Creek, Mich., 2,000,	69.00	57.00	18	.017	.031	83	1180	646	45
Lincoln, Neb., 2,000,	120.00	96.00	20	.030	.056	87	666	380	43
Average . .	$93.00	$74.33	20			78			53

TABLE XIII.

	To Compare All-night with Mid-night Schedule.	To Compare Mid-night with All-night Schedule.
Cost or price per year .	Deduct $\frac{1}{4}$	Add $\frac{1}{3}$
Price per hour . . .	Add $\frac{1}{2}$	Deduct $\frac{1}{3}$
C. P. for 1 cent . . .	Deduct $\frac{2}{3}$	Add $\frac{1}{2}$

The following calculation illustrates the scheme:—

TABLE XIV.

	Price per Year.	Price per Hour.	C. P. for 1 cent.
All night, 4,000 hours	$100.00	$.0250	800
Midnight, 2,000 hours	75.00	.0375	533
To reduce midnight to all-night basis	Add $\frac{1}{3}$	Deduct $\frac{1}{3}$	Add $\frac{1}{2}$

For a comparison of the moonlight-midnight schedules the General Electric bulletin gives two cities (Dover, N.H., and Atchison, Kan.), in which the prices per year are respectively 23 per cent and 50 per cent less than the all-night schedules; the lamp-hour prices are 107 per cent and 64 per cent higher, and the candle-power for one cent is 61 per cent and 39 per cent less. Buckley estimates a 4-hour schedule at 75 per cent more and a 3-hour schedule at 100 per cent more, per lamp-hour, than a 10-hour schedule, while the price per year is $\frac{1}{3}$ to $\frac{2}{5}$ less. Assuming that $\frac{1}{3}$ less is approximately correct, we have the following rule: —

TABLE XV.

	To Compare All-night with Moonlight-Midnight Schedule.	To Compare Moonlight-Midnight Schedule with All-night.
Price per year . . .	Deduct $\frac{1}{3}$.	Add $\frac{1}{2}$.
Price per hour . . .	Add $\frac{3}{4}$.	Deduct $\frac{2}{5}$.
C. P. for 1 cent . . .	Deduct $\frac{3}{5}$.	Add $\frac{3}{2}$.

The following illustrates the rule: —

TABLE XVI.

All-night, 4,000 hours . . .	$100.00	$.0250	800
Moonlight-midnight, 1,600 hours	66.66	.0416	320
To reduce moonlight-midnight to all-night basis	Add $\frac{1}{2}$.	Deduct $\frac{2}{5}$.	Add $\frac{3}{2}$.

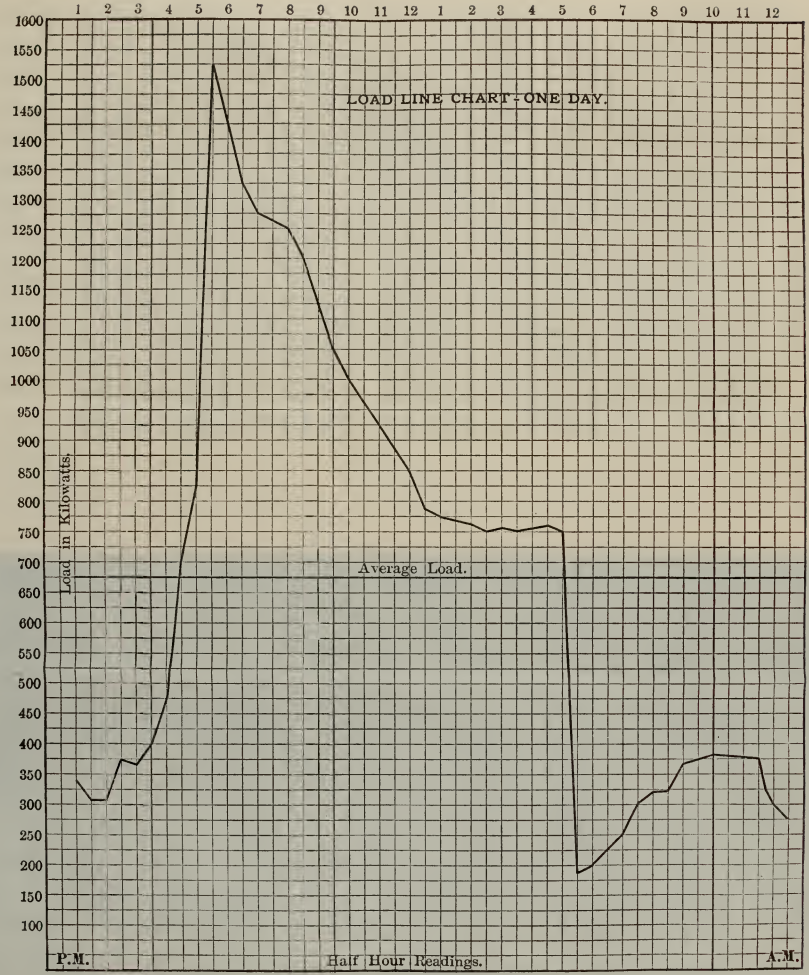
The foregoing rules for correcting the comparisons of costs of electric lighting are offered as combining simplicity and a fair approximation to the actual conditions of the business. The reasons underlying them will appear when once the peculiar character of the business is understood.

Every enterprise has two main divisions of expense:

first, fixed charges, such as interest, rents, royalties, sinking-fund, taxes, insurance; and, second, operating expenses. But operating expenses are also subdivided into fixed expenses and variable expenses. Fixed expenses are salaries, legal expenses, and such part of wages, fuel, etc., as are required to keep the plant going with the minimum hourly output. Variable expenses are proportionate to the output. Now, in electric lighting, the variable expenses form but a small part of the total cost compared with fixed charges and expenses. Electricity cannot be profitably stored for future delivery like gas or other products; but, unless storage batteries become commercially practicable, must be generated at the very time when the consumer uses it. Consequently the plant must always be equipped to supply the *maximum* demand, although this demand occurs for but one hour of but one day in the year. That is to say, the fixed charges and expenses, which are the largest part of the total expense, are determined by the maximum demand, and they continue right through the time of the minimum demand.

The accompanying load line chart, constructed from half-hour readings for one day in a typical station, shows the wide variation in the demands on the station at different hours. In this station the total output was 16,149 kilowatt-hours,[1] an average of 672 kilowatts per hour for

[1] The practical unit of electrical energy, or the rate of working in a circuit, is the *watt*. One horse-power is 746 watts; the *kilowatt* is 1,000 watts. *Watt-hour* is the electrical energy capable of working at the rate of one watt for one hour. The *volt* is the unit of electromotive *force* or pressure; the *ampere* is the unit of *current* or quantity. The volt-ampere is therefore the watt. Thus the standard adopted as a 2,000 candle-power arc lamp is one burning with a current which measures 9.6 amperes and 45 to 50 volts to each lamp, equivalent to 432 to 480 watts. The British "Board of Trade Unit" is the kilowatt, usually abbreviated "B. of T. unit," or simply "unit." This is the legalized unit adopted by the Board of Trade.



VARIATIONS OF OUTPUT BY HOURS.

the day. But the demand ranged from 180 to 1,575 kilowatts; and the total capacity of the plant was utilized for only one half-hour of the day, while practically the same amount of labor was required to operate the plant when the load was 500 as when it was 1,500 kilowatts.

From this chart we can see how it is that, according to Garcke's "Manual of Electrical Undertakings," "the cost of supplying an individual consumer with, say, 100 units [100 kilowatts] of electricity per day is almost entirely governed by the *rate* at which he takes it. If he is a very regular customer, and requires electricity delivered at an even rate for eight hours, it is necessary to keep only about 22 horse-power of plant at the works for his account. If, however, he wants the 100 units delivered to him in one hour, it is necessary to keep about 170 horse-power of plant at the works in readiness for him at any time. Of course, consumers vary largely between these two examples; but the cost of supplying any one of them with a given amount of electricity is chiefly governed by the amount of his maximum demand at any one time.

"The correct way to charge for electricity is to give liberal rebates to those customers who make prolonged use of the plant regularly throughout the year; that is to say, the lower the maximum demand and the greater the consumption, the better should be the discount. [In the Brighton system of charging there are two meters, — the ordinary one, which measures the quantity of electricity taken, and the Wright "demand meter," which indicates the equivalent of the maximum number of lamps which the consumer has ever had on simultaneously during the period for which he is to be charged. In effect, it shows the amount of plant which the station has had to keep on hand for his use.] The principle is usually applied in this way: If the indicator shows that, say, 20 lamps is the greatest

number which the consumer has turned on simultaneously, then he gets a large discount on all the current which his ordinary meter shows that he has taken beyond the equivalent of one hour's daily use of those 20 lamps."

The following table, computed on the Brighton rates, will illustrate the method. The rate at Brighton is 7*d.* (14c.) for one kilowatt one hour daily and 1½*d.* (3c.) per kilowatt-hour in excess.

TABLE XVII. Charges per KW for One to Ten Hours Daily Use by Brighton Municipal Plant, at 7*d.* and. 1½*d.* (14 and 3c.).

Hours.	Computation.	Actual Charge.	Proportionate Charge.
1 hour,	$.14	= $.14	$ .14
2 hours,	.14 + 3	= .17	.28
3 "	.14 + 3 + 3	= .20	.42
4 "	.14 + 3 + 3 + 3	= .23	.56
5 "	.14 + 3 + 3 + 3 + 3	= .26	.70
6 "	.14 + (5 × 3)	= .29	.84
7 "	.14 + (6 × 3)	= .32	.98
8 "	.14 + (7 × 3)	= .35	1.12
9 "	.14 + (8 × 3)	= .38	1.26
10 "	.14 + (9 × 3)	= .41	1.40

Meter rates are universal in Great Britain, whereas contract rates prevail in America. Table XVIII. furnishes a comparison of meter and contract prices in various localities for our four standard schedules, together with a computation showing the percentage of each price which is added for the all-night schedule. The ordinary meter gives, of course, a proportionate price for all quantities of current, — 10 times the quantity of light costs 10 times the price; but Wright's "demand meter" or "indicator," with two rates, gives a digressive price. At Blackburn's rates of 12

cents and 6 cents, one kw. 10 hours costs 5½ times as much as for one hour, and only 83 per cent more than 5 hours. At Brighton's rates of 14 cents and 3 cents, 10 hours costs the consumer 2½ times one hour, and only 60 per cent more than 5 hours. The contract rates in the United States make heavier discounts on long schedules than the heaviest yet adopted by meter in Great Britain, the usual incandescent all-night rate being only 50 per cent higher than the midnight rate; while, as we have already seen, the all-night arc rate for street-lamps is only ⅓ higher than the midnight rate. The latter corresponds closely with Buckley's estimate of the actual increase in cost. (See Table XVIII.)

TABLE XVIII. Comparative Rates and Percentages for Standard Schedules.

Schedule Hours per Night.	Meter Rates Per KW Hour.			Contract Rates.			Per Cent of Rate Added for All-Night Schedule.					
							Meter.			Contract.		
	Proportionate, Private Plants, U.S.	Blackburn, 12c. and 6c. per KW hr.	Brighton, 14c. and 3c.	Incandescent, 16 C. P. per Year.	2,000 C. P., Street.	Buckley-Cost per Year, 2,000 C. P.	Proportionate.	Blackburn.	Brighton.	Incandescent.	Street.	Buckley-Cost.
	$	$	$	$	$	$						
1	.20	.12	.14	..	..	31.02	900	450	121	..	..	130
4	.80	.30	.23	10.00	66.00	51.10	150	120	80	80	50	43
5	1.00	.36	.26	12.00	75.00	54.75	100	83	60	50	33⅓	33
6	1.20	.42	.29	..	80.00	60.21	66⅔	51	42	..	25	22
10	2.00	.66	.41	18.00	100.00	73.00	..	..	..	..	..	..

The Brighton system of charging, by which the advantages of both contract rates and meter rates are combined, is an interesting refutation of the plea that municipal enterprise is not progressive and inventive. The system and the meter employed were both the invention of the city elec-

trician, and have been copied by many private companies. After three years' experience the customers are thoroughly satisfied, and the city sells 50 per cent more current in proportion to the plant used than it could on the ordinary system of charging. "That means that, without reducing expenses, they can reduce the average price to about 75 per cent of the former price, keep up the same rate of dividends, and have everything over the 75 per cent as clear profit."[1] It will be noticed, however, that the meter rates which have been adopted by Brighton have not yet reached the heavy discounts on long schedules which prevail under contract rates in America, and which, according to Buckley, more nearly correspond to the actual relative costs of production.

The foregoing lengthy diversion has seemed necessary in order to prepare the student of electrical-lighting problems for a proper judgment upon the comparisons which Francisco and others have made between the costs of municipal and private enterprises.

Returning now to Francisco's table of candle-power per hour for one cent (Table IV.), we can apply the corrections which have been formulated above, and so secure a common basis of comparison. In Table XIX. I have regrouped the municipal plants cited by him, according to our standard schedules, taking the all-night schedule as the basis, and assuming that all plants with schedules of 3,000 hours and over are sufficiently near the all-night

[1] *The Electrical Engineer*, Oct. 21, 1896, p. 393.

schedule to obviate the need of correction. The other groups have been corrected to the all-night 2,000 c. p. basis, first on the basis of Francisco's estimate of cost (column 4), and second on Parsons's costs as given in Table II., using Francisco's schedules of hours (columns 6, 7). Similar corrections have been made for all the private plants, as will appear in the table.

A study of this table shows that corrections have been made for 18 of the 28 couplets in Francisco's original table, and that, whereas he showed an excess of candle-power for one cent in the private plant over the public plant in every one of the 18 couplets, the corrected table shows that there are but 4 of the 18 cases in which private plants exceed the public. (Compare columns 7 and 10, black-face figures.)

We have now considered the varying factors that should be taken into account in comparing municipal and private costs and prices, but have not yet inquired into the actual statistics on which these comparisons are based.

Table XIX. is based on the figures of costs furnished by Francisco and Parsons respectively, but does not explain the reasons for their wide discrepancies. This is our next inquiry.

TABLE XIX. Francisco's Comparison Corrected, Showing Candle-Power per Hour Furnished for One Cent by Municipal Plants and Private Companies.

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.		IX.	X.
								Private Plants contrasted by Francisco. See Table IV.			
	Hours' Service. Public.	C. P. per hour for 1c. Francisco. See Table IV.	Same corrected for sub-arc. Add ⅓.	Same corrected for schedule.	C. P. per hour, computed with Francisco's schedule on Parsons costs.	Same corrected for sub-arc.	Same corrected for schedule.	[1] Hours.	C. P. for 1c.	Same corre'd for sub-arc.	Same corrected for schedule.
ALL-NIGHT, 2,000 C. P.											
Chicago	3750	385	. .	385	537	. .	**537**	. .	. .	. .	451
Dunkirk, N.Y.	3000	718	. .	718	1052	. .	**1052**	. .	. .	. .	787
Easton, Pa.	3219	449	. .	449	645	. .	**645**	4000	750	. .	**750**
								MOON.			
Bangor, Me.	3750	719	. .	719	1333	. .	**1333**	2555	802	1002	1336
Portland, Ore.	3750	574	. .	574	. .	. .	. .	4000	625	. .	**625**
MOONLIGHT, 2,000 C. P. ADD ⅓.								MOON.			
Alameda, Cal.	2190	137	. .	183	175	. .	**233**	2179	229	. .	**305**
Aurora, Ill.	2622	447	. .	596	870	. .	**1160**	4000	751	. .	**751**
Bay City, Mich.	2418 [2]	531	. .	708	817	. .	**1089**	4000	862	. .	**862**
								MOON.			
Bloomington, Ill.	2247	366	. .	488	690	. .	**920**	2179	375	. .	**500**
Crawfordsville, Ind.	2190	298	. .	397	1052	. .	**1403**	4000	884	. .	**884**
Elgin, Ill.	2190	341	. .	455	800	. .	**1066**	2179	547	. .	**729**

Fairfield, Ia.		2190	285	. .	380	555	. .	**740**	2179	440	. .	**587**
Galion, O.		2190	391	. .	521	800	. .	**1066**	2179	500	625	**833**
Hannibal, Mo.		2450	370	. .	493	. .	. .	. .	4000	1000	. .	**1000**
Marietta, O.		2190	339	. .	452	1052	. .	1403	2179	547	. .	**729**
Frederick, Md.		2190	495	. .	660	700	. .	**966**	4000	626	. .	**626**
Galveston, Tex.		2190	359	. .	478	555	. .	**740**	2179	787	. .	**1049**
Danvers, Mass.	1200	2190 [3]	433	541	721	. .	. .	. .	. .	547	. .	. .
South Norwalk, Conn.	1200	2255 [2]	280	350	467	444	555	**740**	4000	326	407	**407**
MIDNIGHT, 2,000 C. P. ADD $\frac{1}{2}$.												
Herkimer, N.Y.		1875	349	. .	523	. .	. .	. .	. .	833	. .	. .
Madison, N.J.		1875	294	. .	441	. .	. .	. .	3835	539	. .	**539**
Little Rock, Ark.		2168 [2]	369	. .	553	909	. .	**1363**	. .	937	. .	. .
Statesville, N.C.		1875	338	. .	507	715	. .	**1072**	4000	375	. .	**375**
Council Grove, Kan.	1200	1875	154	192	288	800	1000	**1500**	1220 4000	312	. .	**339** [1] **555**
Staunton, Va.	1200	1875	241	361	541	. .	. .	. .	. .	781	. .	. .
MIDNIGHT–MOONLIGHT, 2,000 C.P. ADD $\frac{3}{2}$.				. .								
Madison, Ind.		1460	287	. .	716	. .	. .	. .	. .	366	. .	. .
Ypsilanti, Mich.		1460	298	. .	745	555	. .	**1109**	2250	375	469	625
St. Peters, Minn.		1460	264	. .	660	4000	. .	**10,000**	2179 4000	309	.	**378** [1] **570**

[1] Estimate made by General Electric Company. [2] Foster. [3] Mass. Gas and Electric Light Commissioners.

WHY INVESTIGATORS DIFFER.

With reference to the method of investigation followed by the writers here examined, it must be borne in mind that correspondence and official reports have been mainly relied upon. Foster, by his own showing, had not personally visited any of the plants concerning which he reports; Francisco appears to have visited but one of the sixty-four plants tabulated in his pamphlet; and Parsons has apparently visited not more than five or six.

Now, I do not maintain that the correspondence method will fail to give accurate results. It depends upon the care and pertinacity of the investigator. In this respect Parsons excels the other gentlemen. Foster makes many guesses upon the rate of interest, cost of labor and fuel, number of hours burning, and candle-power. These two writers give the official figures wherever they have obtained them, and then their own estimates subsequently as computed, and as printed in Table II. Francisco gives only occasionally the data for his computations, and we are left to infer them from hints here and there. The principal difficulty in the way of securing sound results by correspondence is the impossibility of finding out and weighing the hundred and one local peculiarities which give tone and detail to the enterprise.

These often give a decided turn to the inquiry.

Many of them cannot be presented statistically. For example, the village of Batavia, New York, by providing a council chamber in the building which houses its electrical plant, saves $120 in rent each year, equal to $1.20 per arc light. Further, no one can appreciate the sense of relief from the exactions of private corporations, and the civic pride and dignity of the citizens who have successfully overcome these exactions, unless he visits them, talks with them, and learns the history of their movement for municipal ownership.

OPERATING EXPENSES.

In attempting to explain the wide discrepancies in these three methods of estimating the cost of municipal lighting, we need to divide the cost of production into two parts, operating expenses and fixed charges. Operating expenses are usually stated by the officials of the various cities in their annual reports; and these, with the annual output given, make it difficult to arrive at wide discrepancies in estimating the operating costs per lamp. While Foster and Parsons reach apparently opposite conclusions regarding the cost of municipal compared with private enterprise, yet their differences are found not so much in the *labor cost* per arc light (see Table I.), nor in the total operating expenses (see Table XX.), as in their estimates

on interest and depreciation. The actual operating expenses, including wages, fuel, stores, and supplies, are matters of record stated by the local officials themselves in their annual reports, together with the total number of lights operated during the year. Therefore but little variation could occur in computing the labor cost, as will be seen by noting the cases where the two happen to give figures on the same plant. I give herewith all the cities on which both give reports.

TABLE XX.

Comparative Estimates of Operating Expenses per Arc Lamp.

	FOSTER.	PARSONS.
Chicago, Ill.	$96.50	$96.50
Easton, Pa.	82.44	85.33
W. Troy (Watervliet), N.Y.	61.22	61.00
Dunkirk, N.Y.	47.28	46.00
Goshen, Ind.	67.85	68.00
Painesville, O.	49.42	52.50
Little Rock, Ark.	68.50[1]	42.00[1]
Aurora, Ill.	57.59	53.50
Fairfield, Iowa	70.39	70.00

Francisco is an exception to this agreement. He vigorously attacks the published reports, and discovers malicious attempts to transfer accounts, to misrepresent operating expenses and repairs as new construction, to charge electric light to other departments, and generally to bolster up a rotten business for the benefit of nobody but the politi-

[1] Foster gives 132 arcs, Parsons 210.

cians. I am unable to follow him in all his figures; but, judging from his analysis of the financial accounts of Swanton, Vt., one can fairly conclude that his treatment of other municipal plants is utterly untrustworthy.[1]

[1] Francisco says, in the *Electrical World* for June 8, 1897, that the village of Swanton, Vt., "voted a tax of 30 per cent, one-half of it to be used in paying the expenses of the electric-light plant, and the other half for all the other expenses of the village, including streets, sidewalks, sewers, water, fire-department, and police. This shows that the electric lights require one-half of the entire money received from the tax levy." As a matter of fact, the report referred to shows that the village treasurer collected a total of $2,787.02 taxes; and of this amount he paid, for —

Highways	$1,075.55 =	40%
For general expenses and fire	806.67 =	30%
For water (profits, $1,443)	0 =	0
For electric light	806.66 =	30%
Total	$2,688.88	100%

It also shows that the —

Total expenditures of the electric department, including interest, insurance, and taxes, were		$4,661.13
Total income, commercial	$4,158.05	
Total income, taxes[1]	835.53	
		4,964.71
Profits		$303.58

[1] Including $28.87 uncollected.

So that the net payment out of taxes for electric light was $531.95 ($835.53 – $303.58), which was 19 per cent of the taxes collected, instead of 50 per cent, as stated by Francisco. The actual cost per lamp to the taxpayers for 20 arcs was $26.59 per year, including interest. Depreciation would add to this; but as taxes were not used to pay for depreciation, and were actually used to pay for highways and fire protection, which (with the balance left in the hands of the treasurer) took 81 per cent of all the taxes collected, it is difficult to see how Francisco's imagination could have dealt so lavishly with the finances of Swanton.

Francisco has also a sliding-scale for depreciation. Where he thinks the operating expenses and interest charges of a municipal plant are high, and do not need much inflation, he calculates depreciation at 5 per cent, as in Braintree and Swanton. But when expenses are low, depreciation rises to 8 per cent, as in South Norwalk, Detroit, and other places. I mention only those places where he himself states the rate of depreciation. In other cases I am led to infer that it vibrates up and down, usually near the 8 per cent pole, by comparing his figures with those of Foster, who uniformly estimates depreciation at 7½ per cent.

Turning now to Foster's investigation, we are at once impressed with its marks of candor and ability. Writing, as he does, under conditions opposed to public ownership, it is a matter of moment that he should publish such statements as these: —

"The tone of all communications from those favoring the municipal side seems to have taken it for granted that the results shown would tell that side sufficiently well; and it must be admitted that, in quite a number of cases, such is the fact." Commenting upon the fact that the average cost per lamp of 2,000 candle-power for installing a municipal plant complete is shown to be $249.30, and that this is very close to the price quoted by manufacturing companies to private purchasers, he remarks, "This is seemingly contrary to the commonly made statement, that municipal plants are not bought as cheaply as private, said

to be due in a measure to 'jobs.' Perhaps these 'jobs' may be offset in the purchase of private plants by the commission sometimes paid some member of the company." Again, he says, "In all fairness it may be said that the much-vaunted better management in private hands does not exist. In fact, the men in charge of city plants compare quite favorably with those in charge of private plants of similar size."

These statements seem to show that, in his own mind, whatever conclusions others may draw from his figures, his careful investigation has not proven what its projectors intended, viz., a demonstration of the greater economy of private electrical lighting; and his figures themselves, as will be shown below, when rightly examined in the light of the facts and of statistical rules, are not only not a disproof of the claims of municipal ownership, but a strong testimony in their favor.

Foster agrees with what I have already stated above with reference to operating costs; i.e., that there is comparatively little disagreement among the returns made by different investigators. In order to show this, he gives the following table (XXI.), from which fixed charges have been excluded.

Foster says, in commenting upon these figures:

"Attention must be called to the remarkable agreement of cost in the American municipal stations and the average of the English stations, and again to that of the six large American stations and the German average; both of the last two are equipped with large units in engines and dyna-

mos, which probably accounts for the cost being lower than in the others."

He says also, —

"The item of labor is the one division of operating expense in which it is claimed the greatest expenditure will be made in municipal plants. If the average here shown may be considered accurate within reason, this belief is largely a myth; for (with the exception of Chicago, where labor is 53 per cent of the operating expenses) the percentage for labor is less than usual in private plants. Either very low wages and very poor help are the rule, or the item has been classed wrongly."

TABLE XXI.

Comparison of Operating Expenses per KW.

	Labor per kw.	Fuel per kw.	Supplies and Offices per kw.	Total Cost per kw.
14 American Municipal Stations, street-lamps only .	$.025	$1.0173	$.0161	$.0585
5 American Municipal Stations, Incandescent . .	.0244	.0226	.0126	.0596
1 American Municipal Station, Arc, New	.0317	.0199	.0069	.0585
6 American Private Stations, Mixed Output of 5,300,000 kw.	. .	.0095	. .	.0473
5 German Stations, Output 1,907,900 kw.	.0218	. .	. .	.0469
23 English Stations, Average, Crompton	.0144	.0222	.0194	.0560
Ideal English Stations, Crompton.	.0040	.0054	.0170	.0264
Lowest Items in 23 Stations, Weaver	.0074	.0126	.0173	.0373

FIXED CHARGES — INTEREST.

It is when we come to the matter of "fixed charges," including interest, depreciation, insurance, and taxes, that we find the widest divergences between the advocates and opponents of municipal ownership. It is here that almost the entire difference between the figures of Foster and Parsons is to be found. Foster estimates interest uniformly upon the entire cost of the plant up to date at the uniform rate of 6 per cent, unless the officials have given him a different rate. As the actual rate is thus given in only sixteen of the thirty-four cities whose returns he has tabulated, he has guessed at the rate in eighteen. In every case where I have been able to find the actual rate, as against his guess, the rate is 4 per cent. And it may be stated, as a general rule, that the smaller cities in the East can borrow money without difficulty at 4 per cent, getting a premium on the bonds at this rate; and in the middle West no higher rate than 5 per cent is paid, rising to 6 and 7 on the Pacific coast.

Oxford, Ohio, pays only 3½ per cent on the greater part of its water and electric-light bonds. Chicago borrows money at 3 per cent, whereas Foster's gross interest charge for that city figures out 4.2 per cent. A difference of 2 per cent on the average investment of $250 per arc light

makes a difference of $5 per year per arc in the aggregate cost.

Parsons estimates interest, not on the total cost of the plant, as does Foster, but upon the actual amount of bonds outstanding. Therefore, if no debt has been incurred for the electrical plant, or if the debt has been paid, interest entirely disappears from his calculation of cost. In cities without a debt on the plant, therefore, the difference between the total costs of Foster and Parsons would average $15 per arc lamp per year.

Parsons's reason for including interest, not on the entire cost of the plant, but only on the outstanding debt, is that in municipal ownership the people pay interest to themselves, except where a debt makes a creditor in effect part owner; and, therefore, to calculate interest on the total cost in excess of the debt would be only to take out of one pocket and put into another. This reason does not appear sound. Taxpayers and consumers are not the same individuals, except in street-plants alone. The true economic principle seems to be as follows: —

The taxpayers must pay for street-lighting either to a private company or to a municipal plant. If the cost of the lamps operated by the latter, including interest, depreciation, and insurance, is less than the amount that would be paid to a company, the difference is a saving to taxpayers which would not occur except with municipal ownership. If,

therefore, new construction and payments on the principal of the debt, as far as met out of taxes, do not exceed the amount of this saving, such disposition of the taxpayers' money is not an assessment upon them, or an investment made by them upon which interest should be received, because they have no alternative investment, and could not have gained interest upon it anyhow; but it is an administrative economy tending to the ultimate extinction of the debt and further lessening of taxes. The city of Detroit paid $175,000 yearly for 1,279 private lights, and now gets 1,716 arc equivalents for $134,000, including interest and depreciation. The difference of $41,000 yearly, if put into new construction or a sinking-fund, is not an increased burden upon the taxpayers, and therefore does not give them a right to charge interest upon it to the consumers.

The city of Watervliet, N.Y., has for seven years furnished its 115 arc lamps at a cost of $75 each, including depreciation, but not interest. Its neighbor, Troy, has paid a private company during the same time $146 for like service. Watervliet's plant cost $26,000, but was paid for in two assessments without the issue of bonds. Distributed over the seven years, with interest on the $26,000 at 4 per cent for half the time, this interest and sinking fund would have been equivalent to $36.82 per lamp-year, making the total expense to the taxpayers $111.82, against the $146 paid by Troy.

It is proper enough that interest should henceforth be omitted from the computation of Watervliet's annual expense; and, should a commercial system be added, the consumers should have the benefit of charges based on freedom from interest payments. Therefore, while criticising Parsons's reasons, I agree that both he and city officials are right in figuring interest only on the outstanding debt. This gives the true cost of production to the taxpayers, and the saving of interest in this way must be counted as one of the most important economies which municipal ownership brings. This saving, of course, does not appear prominently in the early years of the enterprise; but it becomes increasingly valuable as fast as the debt is liquidated. Foster's computation of interest at 6 per cent on the entire cost of plant to date is therefore doubly excessive; for, besides the falsely high rate, it includes interest on construction paid out of profits and savings which are not properly considered an investment and entitled to interest payments.

TAXES.

The amount of taxes paid by electric-light companies varies so widely in different States and cities that it is impossible to state a rule that will have general application. Parsons says that the amount actually paid by the companies is about two dollars per arc equivalent, or $\frac{3}{4}$ of 1 per cent

to 1 per cent on the fair investment. In New York City, according to the census report, it was $\frac{1}{3}$ of 1 per cent on the total valuation, or, omitting patents, $\frac{6}{10}$ of 1 per cent. In the State at large it was $\frac{1}{2}$ of 1 per cent.

According to the report of the Massachusetts Gas and Electric Light Commissioners, the total amount of taxes paid by all the electric-light companies of the State for the year ending June 30, 1896, was $168,218.83, which was 4 per cent of their gross receipts ($4,187,260), $6\frac{2}{10}$ per cent of their operating expenses ($2,739,783), and 1.06 per cent of their total assets ($15,892,336). The two Boston companies, with the equivalent of 22,970 arc lamps of 2,000 capacity each, installed for both street and commercial lighting and motors, paid in 1896 taxes amounting to $72,333.96, being $4.42 per arc equivalent, and 1.05 per cent on the combined assets of the companies ($6,898,786).

The Edison Illuminating Company of New York, with the equivalent of 42,582 arcs, installed in 1895, paid for "general and legal expenses and taxes," $218,421, equal to $5.13 per arc, showing taxes to be much less than in Boston.

The Detroit assessors at the request of the Public Lighting Commission placed an assessed valuation on the city plant at $427,500, the amount of the investment for the year having been $714,843.76. Computing city taxes on this valuation, the loss to the city in taxes was $7,981,43, or $5.10 per arc light, or $1\frac{1}{10}$ per cent on the cash investment.

The Massachusetts rate of taxation on corporations is unquestionably higher than that in any

other State, and the rate of 1 per cent on the total investment may, therefore, be taken as the maximum taxes which the city loses through municipal ownership. But it is a mistake to consider this as a loss to the taxpayers. It is more than compensated by the increased valuations of property which follow upon increased municipal lighting. In Jamestown, N.Y., the extension of lamps to the suburbs and to unimproved property has contributed largely to the building up of outlying areas, and the consequent increase of assessed valuation. Where there is a commercial plant, the reduction of 25 to 50 per cent in commercial rates increases the profits of business, and hence the valuation of real estate and business holdings. This tends to lessen the tax rate.

But this is not all. There is also an actual distribution of profits among the taxpayers, not otherwise taken into account in any part of this essay, following upon the improved processes and lessened costs of production. Where the price is fixed by contract with a private company, this lessened cost goes, of course, to swell the dividends of the company, and appears as the increased market value of the stocks and bonds. When owned by the city this reduction goes directly to the taxpayers. For example, the average cost per lamp per night of the municipal plant of South Norwalk, Conn., shows in six years a total

reduction in cost of 3.65 cents, or $11.24 per lamp per year, as follows : —

Average cost per lamp per night, 1,200 c. p., South Norwalk.

Year ending Oct. 12, 1893 . .	20.75 cents.
Year ending Oct. 12, 1894 . .	19.20 cents.
Year ending Oct. 12, 1895 . .	19.00 cents.
Year ending Oct. 12, 1896 . .	18.60 cents.
Year ending Oct. 12, 1897 . .	17.40 cents.

Reduction in six years, 3.65 cents per night. The average number of nights being 308, the saving per lamp per year is $11.24, or $1,124 for the 100 lamps actually burned. This saving, if capitalized at double the current rate of interest [1] paid by a private business, or 10 per cent, would have shown itself in an increased market value of the stocks and bonds of the company, amounting to $11,240 on a business where the actual cost of construction was $20,000, an increase of 56 per cent in the capitalization. The tax on the plant at 1 per cent would be only $312.40, so that the saving for the sixth year to the taxpayers is nearly three times the loss in taxes.

The city of Manchester, Eng., has reduced the cost of production of light and power sold to customers from 3*d.* (6 cents) per kilowatt-hour (exclusive of fixed charges) in 1893–1894 to 2.17*d.* in 1894–1895, 1.80*d.* in 1895–1896, and 1.46*d.*

[1] See Commons, "The Distribution of Wealth," New York, 1893, pp. 193, and 239 ff.

(2.92 cents) in 1896–1897, a reduction of $51\frac{3}{10}$ per cent in cost of operation.[1] Taking the estimate of 1800 kilowatt-hours as the consumption of a 2,000 c. p. arc light of 450 watts burning 4,000 hours, or one year, it will be seen that this reduction in cost of 2.92 cents per kw. amounts to a reduction in the arc light from $108 per year in 1893–1894 to $52.56 in 1896–1897, or a saving of $55.44 per lamp. On a five-year contract given to a private company at the cost of operation in 1893–1894, Manchester taxpayers would, of course, have lost this reduction in costs of production; but, having secured the reduction to themselves through municipal ownership, it appears in lessened taxes and therefore higher capitalization of their own taxable property, rather than in higher capitalization of a private electrical plant. So great is this saving in all municipal plants, consequent on improved machinery and the economies that follow increasing output from year to year, that it far exceeds the highest estimate of the loss of taxes which can fairly be charged against municipal ownership. Seeing that in no other connection have I made allowance for this item, we are justified in setting it off at this point against the item of lost taxes, and therefore to omit the latter item altogether, as an element in the cost of municipal lighting. It will be seen

[1] *The Electrician*, Dec. 3, 1897, p. 197.

that this amounts to a difference of $2 to $5 per arc light in the final balance.[1]

[1] The following extract, from *London* of April 21, 1898, gives added force to the statement in the text: "That the tendency is to reduce the cost of generation and distribution of electrical energy as the work extends, and as time goes on, was proved by Mr. Robert Hammond in the important paper he recently read before the Institution of Electrical Engineers. Mr. Hammond is an expert at analyzing accounts, and his careful and elaborate tables form the most complete inquiry into the cost of production which has been produced. His tables show that in some cases the charge for current has been reduced to such an extent that some of the towns are now able to supply it at 1½ *d.* (3 cents) per unit (k.w.) for all consumption beyond the average of one hour per day. [See description of Brighton meter system above.] The total cost per unit sold, which includes management, expenses, rent, taxes, etc., gets less every year. Bradford municipal corporation, for instance, where the first year the cost was 4.58 *d.* (9.16 cents), has been gradually reduced to 1.81 *d.* (3.62 cents). At Brighton the cost began at 3.76 *d.* (7.52 cents), and has decreased to 2.04 *d.* (4.08 cents). In Manchester the total cost in 1894 was 2.17 *d.* (4.34 cents), and it is now reduced to 1.45 *d.* (2.90 cents). In Glasgow the cost began at 4.51 *d.* (9.02 cents), and decreased to 1.92 *d.* (3.84 cents). The total cost in the first year of the Hampstead supply was 6.66 *d.* (13.32 cents), which was exceptionally high. In the second year it was reduced by more than one-half, being 3.30 *d.* (6.60 cents). In Islington the first year cost 4.58 *d.* (9.16 cents), the second 3.57 *d.* (7.14 cents). In St. Pancras the cost has been reduced from 4.66 *d.* (9.32 cents) to 3.30 *d.* (6.60 cents). In some of the more successful London private companies the cost has been reduced to a still lower figure as their supply extends. In the City of London Company the total cost of production has been reduced to 3½ *d.* (7 cents), although the price per unit sold is 8 *d.* (16 cents), which is the highest charge in the country, as it is the same for heat and power as for illuminating purposes. The difference between the cost of production and the price of current is the penalty which the city pays for having allowed this profitable monopoly to be established. It is able to pay a dividend of 7 per cent, to pay £16,000 interest on loans, and set aside more than that amount for depreciation."

INSURANCE.

Insurance actually paid is usually entered in operating expenses, and need not be added as a fixed charge. It is a small item, ½ of 1 per cent in Batavia, nothing in Dunkirk, 1 per cent in Watervliet, $\frac{2}{10}$ of 1 per cent in Jamestown, computed upon the total cost of the plant. The larger cities, Detroit and Chicago, do not carry insurance. This is proper enough for a large city, where the loss by fire when spread over the tax-rolls would cause but an insignificant increase in taxes; but small towns like Tipton, Iowa, whose plant was destroyed by fire, are unable to rebuild, especially if already in debt.

Insurance need not in itself be included as an additional expense to be estimated in calculating the cost of municipal ownership. If, however, it is not included by municipalities in their operating expenses, it should be represented in a sinking-fund, which will be considered below.

DEPRECIATION.

Depreciation is the item of keenest dispute in the contest over municipal electric lighting. Francisco quotes electrical engineers who assert that the depreciation on engines and boilers is 5 per cent, and on electrical apparatus, lamps, and dynamos, 10 per

cent. He does not itemize any other parts of a plant; and, taking these two, the depreciation for the first year on the *total cost* of the Detroit plant would be $1\frac{4}{10}$ per cent, as follows, instead of 8 per cent, as usually estimated by him: —

TABLE XXII.

Estimated Depreciation on Detroit Municipal Plant, 1895–1896.

	Cost.	Rate Per Cent of Depreciation.	Amount of Depreciation.
Steam plant	$82,152	5	$4,107
Arc lamps	29,628	10	2,962
Electric plant	40,842	10	4,084
Balance of entire plant ..	477,519	0	0
Net cost of plant to date .	$630,141	1.4	$9,153

Parsons arrives at his estimate of 3 per cent depreciation as shown in Table XXIII., taking the Braintree plant as an example.

For an underground plant like that of Chicago, he figures the depreciation at one and six-tenths per cent of the total investment, as in Table XXIV.

The estimates for depreciation as here given are, of course, not actually written off by the municipal officials, but are calculations made by Parsons. In fact, it is almost invariably the rule that the managers of municipal plants make no allowance whatever for depreciation. Foster complains that in but two instances (South Norwalk, Conn., and Rockport, Mo.) have the authorities reporting to him

TABLE XXIII. Braintree — Distribution of Investment and Depreciation. — PARSONS.

	INVESTMENT.	PER CENT OF DEPRECIATION.	AMOUNT OF DEPRECIATION.
Land	$ 940	0	$ 0
Buildings	6,630	1	66
Steam plant	11,900	4	476
Electric plant	7,640	3	229
Lines	13,580	1	136
Poles	3,630	10	363
Lamps	4,630	4	185
Meters	1,560	2	31
Transformers	2,280	3	68
Tools and furniture	580	8	46
Supplies	610	0	0
Services of architect and engineer	620	0	0
Total	$54,600	2.9	$1,600

TABLE XXIV. Chicago — Distribution of Investment and Depreciation. — PARSONS.

	INVESTMENT.	PER CENT OF DEPRECIATION.	AMOUNT OF DEPRECIATION.
Land	$100,000	0	$ 0
Buildings	66,987	1	669
Steam plant	95,518	4	3,820
Electric plant	58,075	3	1,742
Lines	317,040	1	3,170
Poles	. .	. . .	. .
Lamps	41,240	4	1,650
Tools and furniture	610	8	50
Supplies	8,840	0	0
Total	$688,310	1.6	$11,101

made allowance for this item. If they mention it at all, they usually say that they keep their plant in

good working condition, making repairs promptly; and that repairs and renewals, which are charged to operating expenses, wholly cover depreciation. So unusual is it for cities to make this separate charge that it is of interest to notice the exceptions. In the first annual report of the Detroit commissioners no attempt was made to figure a depreciation; but in the second report it was stated: "The entire equipment is maintained in the best possible condition of repair, so that the cost chargeable to depreciation is reduced to a minimum. The only part that in time will have to be replaced in an entirety is the boilers, and experience has shown that their life should be 20 to 25 years. Four per cent of their cost is therefore added to the cost of a lamp, or $1.85 to the cost of an arc, and 12 cents to the cost of an incandescent lamp."

In the South Norwalk plant, depreciation is charged in 1896 at 5 per cent against "all apparatus and material subject to wear and tear" to the value of $15,576, making a total amount of $777.46, or $3\frac{4}{10}$ per cent on the total cost of $22,694.

These two cases are indeed exceptions to the general rule. But it is to be noticed that, even in these cases, depreciation is only an estimate of curious interest, and does not actually enter into the book-keeping of the plants, nor is the depreciation actually written off from the capital. It is presented only as a matter of public interest in making

comparisons with the charges of private companies. The Herkimer commission states the matter as follows. They say, "We formulate as a matter of general interest these propositions: —

		Cost per Lamp per Year.	Cost per Lamp per Hour.	Candle-Power for 1 cent.
First Proposition, —				
Actual operating expenses, 55 lamps of 2,000 C. P.	$3,269.87	$59.45	$.0202	988
Second Proposition, —				
Actual operating expenses, 55 lamps . .	3,269.87			
Add 1 year's interest on bonds	560.00			
Operating expenses and interest	$3,829.87	69.63	.0237	844
Third Proposition, —				
Operating expenses and interest for 55 lamps .	3,829.87			
Add 5% depreciation on plant, $16,858.53 . .	842.93			
Operating expenses, interest, and depreciation	$4,672.80	84.96	.0289	692"

That American cities should neglect to write off depreciation is not to their discredit compared with private corporations. Foster says (p. 184), "It is but fair to say, that, in a comparison of municipal with private plants, the charging off for depreciation and interest is fully as much neglected by one as by the other, less than one in ten of either paying any attention whatever

to these items." The report of the Massachusetts Gas and Electric Light Commissioners shows that, in 1896, the electric-light companies of that State set aside for depreciation funds $446,662.89, which was 3 per cent of the total assets of the companies; $250,000 of this was credited to one company, the Boston Electric. Of the 83 companies in the State, only 33 made an account of depreciation; and apart from the Boston Electric, whose depreciation was 8 per cent of its assets and 15 per cent of its capital stock, and the Edison of Boston, whose depreciation was $2\frac{8}{10}$ per cent of the capital stock and $2\frac{3}{10}$ per cent of the assets, the depreciation entered by the other 31 companies was less than $\frac{1}{2}$ of 1 per cent. The Edison Illuminating Company of New York, in 1894, for the first time carried a part of its profits to a depreciation fund; and the directors, remarking upon the novelty of the transaction, wrote: "This conservative course will no doubt commend itself to the stockholders."

As to these private companies, it does not follow, because they carry a depreciation fund, that they have actually written any depreciation off from their capital investment. The proper method would be to deduct depreciation from the capital, and to add new construction, giving at the end of each year a new net capital investment; but, as the companies are usually stocked and bonded

at a high figure, it is of some advantage to them to keep adding new construction to their construction accounts without deducting depreciation, thus actually inflating their apparent investments. The depreciation fund which they carry is therefore merely a part of a larger policy which conservative corporations adopt, namely, the accumulation of a surplus in the treasury of the company, rather than the distribution of this surplus in dividends to stockholders. This surplus may be invested in stocks and bonds of its own, or of other companies, or may appear in several different forms, such as profit and loss, depreciation fund, reserve fund, or insurance fund. By a policy of this kind the stockholders, though getting smaller dividends for the time, are nevertheless, while keeping up their plant by repairs, renewals, new construction, and operating expenses, increasing the market value of their stock, and their capacity to buy up and absorb other corporations and competitors, besides also giving added security to their bonds, and increasing the company's ability to borrow money at low rates.

Now, these conditions are wholly absent from a municipal corporation owning and operating an electrical plant. The taxpayers do not hold negotiable stock in the plant, which they may wish to hypothecate and so desire to have it backed by the possession of a reserve fund. They do not want

the electrical plant to accumulate a surplus to be invested in securities against either future extensions of the business or replacements of worn-out machinery. The city is not a business corporation empowered to reinvest the earnings of its stockholders, the taxpayers; but the latter want to reinvest their own money in their own way, and under their own individual control. Hence they want their dividends at once for private purposes in the form of *low taxes or low charges.* This leaves no room for the accumulation of a reserve, by whatever name it may be known. If the municipality is to take account of the depreciation at all, it is not in the form of a surplus fund on which the future taxpayers may draw in case of exigency, but it is in the form of such a provision for the distribution of depreciation over successive years that the taxpayers of no single year will be unduly oppressed. This will appear more clearly if we consider the true nature of depreciation.

There are three kinds of depreciation to be taken into account, — depreciation by *use*, depreciation by *competitive improvements*, and depreciation by *replacements*.

Depreciation by *use* is the actual wear and tear upon machinery, the burning out of armatures, the breaking of globes and lamps, the crippling of tools, the weathering of paint, poles, lines, and so on. This kind of depreciation is entirely covered

by the item of repairs and renewals, properly chargeable to operating expenses, and is so entered by every honest official. It does not need additional provision under fixed charges. However, it eventually contributes to the third form of depreciation, that of replacement.

Depreciation by *competitive improvements* consists in the lower cost of operation and maintenance which new inventions and improved machinery have introduced since the installation of the plant. It is asserted now that the saving effected in arc lighting by substituting 100 and 125 arc dynamos for the 35 and 50 arc dynamos of the earlier days is 40 per cent of the maintenance. In the direct-current service the large units effect a saving of 20 per cent, which is increased even to 50 per cent by being directly connected to the shaft of the engine instead of being belted. In alternating currents the difference is less; but the lower speed, lower temperature, and ability to run continuously make their adoption a commercial gain. Such striking improvements in electrical machinery within ten years render the plants of that length of service quite antiquated. Were the business a competitive one, and readily open to new companies, there could be no question that the private plants installed a few years ago would all now be bankrupt, in so far as they have not met the improvements of the day by substituting

new machinery. But having a monopoly, and being able to charge the prices of a decade ago, they are protected in the use of antiquated machinery, and need introduce the new appliances only with the extension of new business. This kind of depreciation in a competitive business would be corrected by writing off depreciation from the capitalization, and the market value of the stock would sink gradually until bankruptcy or reconstruction ended it. But in a monopolistic business the power to keep up old rates is the power to withstand the pressure of competitive improvements. This is the very reason why, in such a business, municipal ownership, or at least municipal regulation of charges, is demanded. And if the municipality, in case of ownership, did not choose to put in the new machinery before the old should wear out, the consumers certainly would be no worse off than with private monopoly. Certain it is that the charges by private companies for either public or private lighting have not fallen in porportion to the great improvements in production, even where the companies have been enterprising enough to replace the old by the new machine. It is this kind of depreciation by competitive improvements that experts have in mind when they place depreciation at 10 per cent. For certainly the life of a dynamo is equal to the life of an engine if it be equally well cared for and if

repairs are made as needed, and the depreciation by *use* in either case would not shorten the life of the apparatus to less than thirty or forty years. Depreciation by competitive improvements is not to be computed as a fixed charge; since it already shows itself in operating expenses by relatively high cost of fuel, labor, repairs, etc., compared with those plants that have new machinery.

Depreciation by *replacement* occurs as a result of the other two forms of depreciation, when old machinery, through wear and tear and in view of improvements, is sold out, and new is put in its place. When this shall occur depends upon the policy of the management. It may be to the advantage of an enterprise to retain old machinery, thereby increasing the operating expenses, rather than incur the expense of replacements for the sake of the estimated savings in operation. A few enterprising private companies have already begun to reconstruct their electrical plants, not because of depreciation by use, nor by competition, but because the saving with new improvements more than covers profits on the cost of reconstruction. As a rule, however, in a monopolistic business of this kind, replacement does not occur until depreciation by use has advanced so far that repairs and renewal of minor parts fail to maintain the efficiency of the plant. Whether in the case of a city or a company, the financial circumstances of the

owners determine how long they shall wait before selling the old and substituting the new. On this basis it will be safe on the whole to estimate that the entire depreciable part of the plant, including steam and electric plants, poles, lines, meters, transformers, lamps, should be replaced every twenty to thirty years. This replacement would not occur all at once, but would be distributed throughout the period.

We can now make plain another reason why a city need not accumulate a depreciation fund, and why a private company must do so. In a city the entire taxable property of the citizens is liable to assessment when the time arrives for purchasing new machinery in place of old, while in a private company only the capital actually invested is so liable. In the former case, therefore, the increased tax-rate for replacements would be so insignificant as to need almost no consideration; in the latter it would wipe out the dividends, and reduce the capital stock to a mere speculative interest. For example, the assessed valuation of taxable property in Detroit is $209,586,330. The tax-rate for all purposes is $15\frac{7}{10}$ mills on the dollar. The entire lighting-plant cost $729,222. The electrical part of the plant cost $63,701. Supposing this part were to be entirely replaced in a single year, the tax necessary for the purpose would be only $\frac{3}{10}$ of one mill, which would increase the tax-rate from

$15\frac{7}{10}$ mills to 16 mills. If the same assessment were levied on a private company which had invested $730,000 in the enterprise, the rate would be $8\frac{7}{10}$ per cent (87 mills on the dollar). But the entire electric plant would not need reconstruction in a single year. Its replacement, together with that of the entire depreciable part of the plant, could be distributed over, say, twenty years. This depreciable part of the Detroit plant is $431,186, making $21,559 to be replaced each year. On the entire taxable property of the city this would be a rate of only $\frac{26}{100}$ of a mill, bringing the total rate to 15.96 mills. On the private capital invested this would be a tax of 3 per cent, or 30 mills on the dollar. But this is not all. The private plant would, of course, be bonded for one-half its value, and the interest on the bonded debt at 6 per cent would be a prior lien on the earnings. Consequently, the cost of replacement would come out of the stockholders, representing but one-half the investment. The assessment on stock for replacing one-twentieth of the depreciable plant would, therefore, be 6 per cent as against the $\frac{28}{100}$ of 1 per cent which the taxpayers would be assessed. The capital stock in the one case would be wiped out, but in the other the taxpayers would be unaffected. Even this comparison is unfair to the city of Detroit; for it must be remembered that, in 1893 and 1894, the tax on property for lighting

by a private company was $175,000 yearly for 1,279 lamps; while now it is only $134,000 yearly for all operating expenses, interest, and depreciation on 1,700 arc equivalents. This leaves a balance of at least $40,000 yearly, minus sinking-fund and new construction, without considering the increased lighting, on which to draw for replacements when needed, before the expense can be said to approach that of private lighting. Under such circumstances I do not see how the municipal authorities can be charged with "bad book-keeping." Judged by private standards they could be so charged; and those thousands of private companies which are now distributing what ought to be their reserve funds in dividends to stockholders are either presuming upon their power to force the public to pay for replacements when they come, or their shrewdness in bolstering their stock, and entrapping future innocent stockholders who in turn must reckon with the municipalities.

Below is a table showing the facts just stated concerning Detroit, together with comparative tables for smaller places. It will be seen that small places, with heavier investments relative to taxable property than Detroit, must incur a heavier tax-rate for replacements. This rate is $\frac{5}{10}$ of one mill in Braintree, and $\frac{7}{10}$ of one mill in Reading, Mass., to replace one-twentieth of the depreciable plant, a rate two and three times the estimated rate

in Detroit. But the Braintree and Reading plants are both commercial and street plants; and this brings in a new consideration, namely, the relations between taxpayers and consumers in the maintenance of the electrical works.

Heretofore I have considered only those cities in which the municipal plant is limited to street-lighting. In such cities the taxpayers alone are concerned as to the charges for depreciation.[1] But the inevitable tendency of municipal ownership is to enter the commercial field. Every one of the municipalities owning plants in Massachusetts has already added, or voted to add, this branch to its municipal plant. The advantages to the citizens in taking this step are so patent and unquestionable, that, when a municipal plant has once been installed, they become restless under private commercial lighting.

That municipal rates are much lower than private rates is beyond question. (See Table XXXVI.) Francisco cannot disprove it, either by screwing the figures or inflating depreciation. He therefore complains that the taxpayers are being op-

[1] Prof. John H. Gray, in a critique published in the "Journal of Political Economy," September, 1899, and Mr. Allen Ripley Foote, in a paper laid before the League of American Municipalities, September, 1899, have failed to notice the distinction here made between street-lighting plants and commercial street-plants. In the former the taxpayers alone are interested, and a depreciation fund would amount only to taking out of one pocket to put into another pocket at some future time, — the taxpayers losing interest on their money meantime. In the latter both taxpayers and private users are interested, and a depreciation fund is needed to distribute equitably the depreciation between them.

TABLE XXV. Comparative Burden of Replacements on Municipal and Private Corporations.

	Detroit. Street-Plant.	Reading. Street and Commercial.	Braintree. Street and Commercial.	Braintree. Street-Plant.
Total valuation of taxable property	**1897.** $209,586,330.00	**1896.** $3,206,466.00	**1894.** $4,424,225.00	**1894.** $4,424,225.00
Tax-rate on $1.00	.0157	.0155	.0172	.0172
Total investment	729,222.00	67,698.00	54,600.00	30,160.00
Total cost Electric Plant	63,701.00	7,026.00	7,640.00	2,740.00
Tax-rate on $1.00 necessary to replace electric plant entire	.0003	.0022	.00172	.0006
Assessment on capital invested necessary to replace electric plant	.087	.103	.14	.091
Total cost of depreciable plant — machinery, posts, lamps, lines	431,186.00	43,991.00	45,820.00	21,380.00
Tax-rate on $1.00 necessary to replace $\frac{1}{20}$th of depreciable plant	.00026	.0007	.00050	.00024
Same added to existing rate	.01596	.0162	.01770	.01804
Assessment on capital of private company (stock and bonds) invested, necessary to replace $\frac{1}{20}$th of depreciable plant	.03	.032	.042	.035
Assessment on capital stock alone (estimated at $\frac{1}{2}$ total capitalization)	.06	.064	.084	.07

pressed for the benefit of the consumers; and Foster gives a table showing that, where the city does commercial lighting, the net cost to the city for its street-lights is greater than where it does street-lighting alone, which is explained, he says, by the extremely low prices for commercial work. The table is reproduced on a later page (Table XXX.).

In the operation of a commercial plant, it is a question of policy whether the city shall make a profit, and so reduce the cost of street-lighting to the taxpayers, thus taxing consumers for the benefit of taxpayers, or shall furnish the light to consumers below cost, thus taxing the taxpayers for the benefit of consumers. I assume that the nearest approach to justice is attained when each service pays its own way. Consumers should pay for what they get at its net cost price, and taxpayers should pay for street-lamps at their cost. If this principle be adopted, depreciation should be charged under the operating expenses of the plant, and should be actually written off from the capital from year to year; the taxable property of the city should be assessed a fixed rate per lamp for all street-lamps, the proceeds of which should be debited by the electrical administration as regular income along with the commercial income; and from the two together should be deducted operating expenses, leaving a "profit and loss" or "net rev-

enue" account, which, in turn, should be credited with interest on bonds, depreciation, and sinking-fund. But the matter of depreciation in a public plant is so closely connected with the sinking-fund, that, in order to reach final conclusions concerning it, we shall first consider the latter.

SINKING–FUND AND DEPRECIATION–FUND.

I have already indicated, that, in the management of a private electrical company, the different funds known as "depreciation," "insurance," "reserve," "profit and loss," are identical in principle, and are, in effect, merely subdivisions of a "surplus" or "reserve." This surplus has been retained by the company rather than distributed among the stockholders, not primarily for industrial purposes, but for commercial purposes, as giving greater command over competitors, and protecting against panics and depressions. I have also shown that such a fund is not only not needed, but is a detriment in a municipal street-plant, where the taxpayers prefer to invest their money individually in their own way; but that in a municipal commercial plant, which we are now considering, where charges must be fixed at such a rate as will distribute the cost of street-lighting and commercial lighting fairly between taxpayers and consumers, a charge for depreciation should

be calculated, and upon it should be based the charges, at cost of production thus obtained, for street-lamps and for commercial lamps.

But there is a further distinction to be made between public and private financiering. The bonded debt incurred by a private company is looked upon as an investment and not a burden; it is never to be paid off; it represents the cash actually invested, while the stock stands merely for the speculative and managing interest in the enterprise. The advantages of a permanent debt consist in the fact that it creates a fixed charge upon the business, which is used as an appeal to the public and the courts against lowering the charges by legislation. It is a first claim upon the revenues, and has a superior sanctity over the stock, which is always looked upon as speculative and problematical. Consequently all expenses that can possibly be so treated are transmuted from stocks into bonds, and these are perhaps distributed among the stockholders.

On the other hand, in a public industry a debt is a burden to be liquidated as soon as possible; it detracts just so much from the complete ownership of the people. It creates an idle class, living on fixed and guaranteed incomes. By paying the debt the interest is distributed among the people in lower taxes and lower charges, instead of remaining a permanent claim to prohibit a lessening

of these burdens. As a city can borrow money at a rate 1 to 2 per cent less than that paid by a private company, it can afford, without additional burden to the people, to devote the per centum thus economized to a sinking-fund. A 2-per-cent sinking-fund invested at 4 per cent will wipe out the principal in twenty-eight years. Such an investment takes the place of funds invested by a private company against emergencies for depreciation, insurance, and reserve. All these emergencies, in a municipal plant, can be cared for at the time when they occur, as we have already seen, and especially so if the accumulation of a sinking-fund is in progress, whereby interest payments are being each year lessened. The saving in interest thus effected each year is itself a depreciation-fund, not indeed set aside, but retained in the pockets of the people, and ready to be yielded up on emergency.

Allowing, therefore, that the actual depreciation of an electrical plant above current repairs and maintenance is 3 per cent annually, it follows that, where a city is accumulating a sinking-fund, or is paying its debt to this amount annually, no additional provision is required for a depreciation-fund. The charges for public and private lights should be fixed at a price which will cover operating expenses, interest on debt, and a sinking-fund of this amount. When ultimately the debt is paid,

and the sinking-fund is discontinued, then a depreciation-fund should be established, in order to keep up the annual charge of 3 per cent on the capital invested. This fund should not necessarily be invested in bonds, but should constitute a "new construction" fund, to be credited with such new construction as is ordinarily executed without the issue of bonds. New construction to the amount of 3 per cent annually would offset the depreciation, and would maintain intact the capital value of the plant; and it should therefore be met out of the revenues of the enterprise, rather than out of taxes or bonds.

The cities of Massachusetts are required by law, when establishing a municipal plant, to limit the term of bonds to thirty years, and to provide a sinking-fund to cancel the bonds at maturity; or, in lieu of bonds, they may issue scrip payable in annual installments. In either case these cities are now paying their indebtedness in installments running as high as 7 per cent annually. (Hull pays $3,000 on bonds and $3,333 for sinking-fund on a capital expenditure of $90,000.) Throughout the other States of the Union it is now quite generally accepted by smaller cities that bonds of this kind should be canceled in about thirty years. Batavia, N.Y., pays one-sixth of its electric-lighting debt each year. In all such cases a depreciation fund would be an absurdity.

It is to be noted, however, that in American cities the sinking-fund and debt payments are usually met directly from taxes, and not from charges to consumers. This is in harmony with the principle that charges for services should be as low as possible in order to extend the use of electricity. The same principle is the dominant one in municipal water-works. It differs materially from the policy of the conservative cities of Great Britain, which maintain their charges high enough to cover not only a sinking-fund and a depreciation-fund, but also to insure a profit for the taxpayers. The following table shows for typical cities the per centum on the capital investment which was set aside in 1897 for depreciation and sinking funds, and the total per centum of both these funds.

TABLE XXVI. Annual Contributions, Depreciation, Reserve, and Sinking Funds. — Per Cent.

	DEPRECIATION.	RESERVE.	SINKING.	TOTAL.
Bradford	2.0	. . .	3.3	5.3
Dublin	. . .	. . .	3.9	3.9
Edinburgh	. . .	1.7	2.0	3.7
Glasgow	4.8	. . .	1.0	5.8
Manchester . . .	1.1	2.6	2.3	6.0

These and other British cities carry large reserve and depreciation funds which are usually reinvested in extensions and new construction, or may be held temporarily in the form of securities. Such funds are, therefore, merely a book-keeping device for pay-

ing for new construction by means of high charges to consumers and high profit, rather than by means of bonds and taxes. Table XXVII. shows for these cities the enormous profit earned from commercial electric lighting. Manchester clears $140,625 above operating expenses and interest, amounting to 55 per cent of the gross receipts. This profit is transferred to depreciation and reserve funds amounting to $56,360, which is reinvested in extensions of the plant, to a sinking-fund for liquidation of the debt; and the balance, $48,500, is devoted to the relief of taxes. In other cities having public lights, the city has a profit, as high as $42,000 in Glasgow, above the cost of public lighting.

It appears from these facts that British cities, while ostensibly caring for depreciation, are really compelling consumers to pay for the plants and contribute to the taxes. The policy is one of indirect taxation. The depreciation-funds are but an incident in this larger policy of taxing consumers for the benefit of taxpayers. This is perhaps not a burden on consumers, for, as will appear later, the charges made by municipal plants in Great Britain are somewhat lower than those imposed by private companies; but the policy is one which would probably not be tolerated in American cities. Here the principle of the widest extension of use among the people, and the lowering

TABLE XXVII. Profits Earned by Municipal Plants, 1896–1897 — Great Britain.

	Paid for Public Lighting.	Commercial Lighting.	Gross Revenue.	Operating Expenses and Interest.	Gross Profits.	Net Profit, Public Lighting Deducted.	Distribution of Gross Profit.				
							Depreciation.	Reserve.	Sinking Fund.	In Aid of Taxes.	Surplus Unappropriated.
	$	$	$	$	$	$	$	$	$	$	$
Bradford . .	. .	71,585	71,585	39,705	31,880	31,880	7,865	. .	12,825	2,655	8,535
Dublin . .	10,345	47,980	58,325	52,955	5,370	4,995[1]	. .	. .	11,065	. .	6,070[1]
Edinburgh .	31,445	102,695	134,140	68,475	65,665	34,220	. .	20,250	23,595	21,820	. .
Glasgow . .	14,250	115,060	129,310	72,750	56,560	42,300	31,645	. .	6,580	6,425	11,910
Manchester .	. .	257,415	257,415	116,790	140,625	140,625	16,535	39,825	35,665	48,500	. .

[1] Deficit of $6,070 makes the net cost of public lamps $2,164.00.

of charges for the benefit of consumers, has a stronger hold than in Europe; and popular suffrage brings such pressure on public authorities that charges are usually lowered as often as the revenues will warrant. This American policy is in harmony with the principle already laid down on preceding pages, that, where a sinking-fund or an annual debt payment equal to 3 per cent of the capital is in operation, no further provision is needed for depreciation. The actual wear and tear being included in operating expenses, and depreciation by replacements amounting to but 3 per cent of the total investment, a sinking-fund fully meets this estimated deduction from the capital value of the plant. And when the debt is paid a "depreciation-fund" or "new-construction" fund of 3 per cent can then be created in order to maintain intact the capital value. The provision for a sinking-fund applies to both street-plants and commercial plants, and the charges for commercial lighting should be so placed as to secure it; but the provision for a depreciation-fund applies only to commercial plants, since, as already shown, depreciation in a street-plant is met by taxpayers only when replacement actually occurs, but in a commercial plant the consumers should also contribute to these replacements. This is done by placing the charges high enough to provide for a depreciation-fund.

The foregoing observations turn upon the distinction between "depreciation" and "depreciation-fund." Depreciation is a constant factor, as already shown, and should be taken into account in comparing the cost of public with that of private lighting. Depreciation-fund is merely a device pertaining to the wider policies of cities in regulating the charges for electrical supply, and may or may not be adopted, depending upon the policy which the citizens choose to follow in balancing the claims of taxpayers and consumers.

THE CORRECTED RESULTS OF PREVIOUS INVESTIGATIONS.

Having now considered at length taxes, insurance, depreciation, and sinking-fund, we are ready to proceed with a comparison of the cost of public with private lighting. We see at once how greatly exaggerated are Foster's estimates. He indeed does not make computations for lost taxes; but since this item cannot exceed 1 per cent, and probably should be excluded altogether, and since insurance is included in operating expenses of all the small plants which he examined, his rate of 7½ per cent for depreciation is fully double a reasonable rate. Parsons, who makes fixed charges 5 per cent to cover depreciation, insurance, and lost taxes, is certainly sufficiently liberal to the opponents of

municipal ownership; and indeed, as we have seen, insurance and taxes are not fairly to be added to the costs in municipal plants, leaving 3 per cent as adequate for depreciation.

The exaggerations of Foster's estimates appear yet more clearly when he compares directly the costs under public ownership with the costs under private ownership. He compares the total cost per lamp-hour of the fourteen cities of his investigation which had street-lighting plants alone, with fourteen other cities having private plants (Table XXVIII.). His *averages* apparently show that in municipal plants the cost to the city is 1.86 cents higher per hour than in the private plants.

This table is worthless, both in method and in fact. (1.) Every statistician knows that in getting averages extreme and exceptional cases should be omitted. In these fourteen municipal plants, there are three exceptional cases, — Alameda, Cal., where he himself says the high cost "throws doubt on the accuracy of the figures;" Fairfield, Ia., a diminutive plant, with but fourteen arcs and no commercial lighting; and Anderson, Ind., a plant using natural gas. Two of these cities have exceptionally high costs, and one has exceptionally low costs. Excluding them, the average would be 4.13 instead of 4.44 cents per lamp-hour. (2.) His rate of interest for municipal plants is 6 per cent, which is 50 per cent above the correct rate.

TABLE XXVIII. Comparative Cost of Street Arc Lamps to the Taxpayers. — Foster.[1]

Cities.	Cost per Lamp-Hour.	
	Total Cost for the Output, City Plants.	Total Cost by Contract with Private Plants. Names of Cities not Given.
Goshen, Ind.	$.0480	$.055
Lewiston, Me.	.0257	.052
Easton, Penn.	.0413	.026
Frederick, Md.	.0394	.055
Fairfield, Iowa	.0765 *	.033
Anderson, Ind.	.0150 *	.025
Little Rock, Ark.	.0503	.032
Marshalltown, Ia.	.0226	.033
Alameda, Cal.	.1240 *	.029
Painesville, O.	.0395	.035
Chicago, Ill.	.0430	.032
Elgin, Ill.	.0400	.028
West Troy, N.Y.	.0241	.033
Bay City, Mich.	.0308	.033
Averages	.0444	.0358

(3.) This rate is computed upon the total cost of plant to date, including new construction paid out of taxes. It should be computed only on the outstanding debt. (4.) His rate of depreciation is 7½ per cent, which is more than 100 per cent above the true rate. (5.) He selects fourteen private plants for comparison, which he says are similarly situated (giving no names). But this is impossible; for private plants have always commercial lighting as well as public lighting, and they usually give a

[1] These columns are reproduced later in Table XXIX. for comparison and correction.

lower rate to the city than to private consumers, as will be shown on a later page. They can well afford to do so, for thus they keep their hold on the private citizens. The usual method of judging the companies by their rates to the city overlooks the way in which they are depriving the people at large of the advantages of electricity. (6.) In Table XXX. Mr. Foster selects a different group of sixteen private plants, the average cost of whose lights to the cities is $.086 per kw.-hour ($.041 per lamp-hour), instead of $.0358 per lamp-hour.

Taking the first, second, and fourth of these criticisms into account, and omitting the others, I have drawn up the following table, using the data supplied by Foster himself; and by the side of the estimates which he has made for the fourteen city plants in question, I have placed three trial columns showing what would be the cost per lamp-hour: first, with interest at 4 per cent (the actual rate), and depreciation at 7½ per cent (his rate); secondly, with interest at 4 per cent, and depreciation at 5 per cent; thirdly, with interest at 4 per cent, and depreciation at 3 per cent. Interest in all cases is computed on the total cost of construction, and not on bonded debt. I have also estimated again for each of the four columns what would be the true averages if the three exceptional cases were omitted. It will be seen that, even with depreciation at 7½ per cent, as he claims it should

be, the average cost to cities is only $.0351 when exceptions are omitted, and interest is put at its

TABLE XXIX. Comparative Costs at Different Rates of Interest and Depreciation per Lamp-Hour.

1 Cities.	2 Rate of Interest given by Officials to Foster.	3 Foster's Estimate. Interest 6%. Depreciation 7½%.	4 Same with Interest 4%. Depreciation 7½%.	5 Same with Interest 4%. Depreciation 5%.	6 Same with Interest 4%. Depreciation 3%.	7 Total Price by Contract with Fourteen Private Plants, names of cities not given.—Foster.
		$	$	$	$	$
Goshen, Ind. . .	. .	0.0480	0.0459	0.0426	0.0403	0.055
Lewiston, Me. . .	. .	.0257	.0246	.0231	.0216	.052
Easton, Penn. . .	4	.0413(4%)	.0413	.0388	.0359	.026
Frederick, Md. .	. .	.0319	.0372	.0345	.0323	.055
Fairfield, Ia.[1] . .	. .	.0765	.0712	.0648	.0597	.053
Anderson, Ind.[1] .	. .	.0150	.0141	.0127	.0120	.025
Little Rock, Ark.	. .	.0503	.0448	.0413	.0385	.032
Marshalltown, Ia.	. .	.0226	.0207	.0183	.0162	.033
Alameda, Cal.[1] .	5	.1240	.1229	.1145	.1004	.029
Painesville, O. .	. .	.0395	.0392	.0366	.0347	.035
Chicago, Ill. . .	. .	.0430	.0410	.0371	.0337	.032
Elgin, Ill. . . .	5	.0400	.0391	.0372	.0348	.028
West Troy, N.Y. .	. .	.0241	.0225	.0212	.0199	.033
Bay City, Mich. .	. .	.0308	.0300	.0279	.0262	.033
Averages . . .		.0444	.0425	.0393	.0361	.0358
Extremes omitted		.0413	.0351	.0326	.0304	. .
C. P. per 1 cent .		484	570	613	658	559

[1] These are omitted under "extremes omitted."

true rate of 4 per cent. By the other estimates it is much lower. Thus, while Mr. Foster has been candid, a correction of his guesses and mistakes

of method demonstrates with his own data the decided superiority of the municipal plants.

TABLE XXX. Net Cost of Public Lighting Per KW. to Cities Having Commercial Plant. — FOSTER.

CITY.	COST PER KW. FOR TOTAL OUTPUT.	NET COST PER KW. USED BY CITY after Deducting Commercial Lighting.	COST TO CITIES By Private Companies.
Santa Cruz, Cal.,	$0.2473	$0.2620	$0.115
Portland, Ore.,	.0960	.0913	.077
S. Norwalk, Conn.,	.0528	.0019	.081
Frederick, Md.,	.0569	.0565	.053
Metropolis, Ill.,	.1324	.1770	.091
Council Grove, Kan.	.0884	.0259	.082
Arlington, Minn.,	.0975	.0149	.046
Crawfordsville, Ind.	.0758	.0830	.078
St. Clairsville, O.,	.1540	.2160	.104
Little Rock, Ark.,	.0561	.0011	.041
High Point, N.C.,	.1470	.1760	.065
Marshalltown, Ia.,	.0483	.0617	.080
Alameda, Cal.,	.0565	.0734	.123
Ashtabula, O.,	.1095	.1870	.162
Blue Island, Ill.,	.0956	.1294	.095
Averages	$0.1009	$0.1105	$0.086
Same in lamp-hours, 2,000 c. p. 480 watts,	.0484	.0579	.041
Total cost per lamp-hour, 2,000 c. p., for street-plants alone. (Table XXVIII).	.0444		

Besides Table XXVIII., in which Foster compares the cost of private lighting with that of fourteen cities having street-lighting plants alone, without commercial lighting, he gives also another table, here reproduced (Table XXX.), for fifteen

municipal plants having both street-lighting and commercial lighting. By this table he shows that, after deducting the revenue derived from the commercial plant, the public lights cost the cities more than where no commercial lighting is done. The averages show that the cost for the total output is 10.09 cents per kw., while the cost for city lighting, after deducting commercial income, is 11.05 cents per kw. Reduced to the cost of city lighting per lamp-hour of 2,000 c. p. arcs, the figures are respectively 4.84 cents without, and 5.79 cents with, commercial lighting, compared with 4.1 cents charged by private companies.

When, however, this table is corrected according to the rules given above (see Table XXIX. and page 134), we find that in cities with commercial plants the net cost of public lighting, instead of being $.1105 per kw.-hour ($.0579 per lamp-hour), is only $.0668 per-kw. hour ($.0319 per lamp-hour), and is therefore less than when the city has street-lamps alone, and is less than the price paid to the private companies, which Foster adduces, by $.0192 per kw.-hour ($.0091 per lamp-hour), a difference of 22 per cent in favor of the municipal plants. The table is reproduced here with these corrections (Table XXXI.).

The foregoing analysis of Foster's statistics is enough to show that the actual results of municipal lighting are superior to those of private opera-

TABLE XXXI. Comparative Estimates of Net Cost per Kw. of Public Lighting for Cities having Commercial Plants.

1 Cities.	2 Rate of Interest reported by officials to Foster.	3 Total Cost per Kw. for total output. Foster.	4 Net Cost per Kw. used for city lamps, after deducting commercial income. Foster.	5 Same, with interest 4%, depreciation 7½%.	6 Same, with interest as given and depreciation 5 %.	7 Total Cost by contract with private companies, names not given. Foster.
Crete, Neb.	. .	$ 0.2473	$ 0.2620	$ 0.2439	$ 0.2220	$ 0.115
Chehalis, Wash.	8	.0960	.0913	. .	.0837	.077
Luverne, Minn.	7	.0528	.0019	. .	—.0214 [1]	.081
Dunkirk, N.Y.	. .	.0569	.0565	.0546	.0449	.053
Shelbina, Mo.	7	.1324	.1770	. .	.0417	.091
Farmville, Va.	6	.0884	.0259	. .	.0413	.082
Rock Port, Mo.	6	.0975	.0149	. .	—.0082 [2]	.046
Hope, Ark.	. .	.0758	.0830	.0685	.0507	.078
Arlington, Minn.	. .	.1540	.2160	.2036	.1282	.104
Falls City, Neb.	5	.0561	.0011	. .	—.0093 [3]	.041
Madison, Ga.	6	.1470	.1760	. .	.1620	.065
St. Clairsville, O.	5	.0483	.0617	. .	.0540	.080
Hannibal, Mo.	. .	.0565	.0734	. .	.0585	.123
Quakertown, Pa.	4	.1095	.1870	. .	.1701	.162
Westfield, N.Y.	4	.0956	.1294	. .	.1225	.095
Averages	. .	$ 0.1009	$ 0.1105	. .	$ 0.0668	$ 0.086
Same in lamp-hour, 2,000 c. p.	. .	.0484	.0579	. .	.0319	.041
Candle-power per one cent	. .	237.	345.	. .	627.	488.

[1] Profit, $225. [2] Profit, $160. [3] Profit, $200.

tion. The estimates, therefore, made in the last three columns of Table II. may be considered as marking the extreme cost of municipal lighting, including, as they do, every reasonable charge, and allowing from 2 to 4 per cent more for fixed charges than the facts really demand.

In addition to the foregoing criticisms and discussion of statistical methods, the following items concerning the municipal plants of Allegheny and Detroit are given. The superintendent of public lighting in Allegheny reports that the operating expenses for 1,037 arc lamps in 1896–1897 were $53.55 per lamp, having been $61.24 in 1895–1896. There were also 3,400 incandescents; and on the basis of the total output in kw.-hours, these made a total equivalent of 1,235–2,000 candle-power arcs. The operating expenses were $73,851.98. There was no debt, and depreciation at 3 per cent makes the cost of each arc equivalent to $62.03 per year.

The municipal plant in Detroit for the year ending June 3, 1897, is reported by the commissioners as furnishing 1,564 arc lamps, including interest, depreciation, and lost taxes, at a cost of $89.42 each per year. There were also 3,064 incandescents in public buildings, which, on the basis of the output in kilowatts, bring the total full arc equivalents to 1,716. The total cost, computed according to the principles laid down in this chapter, was $90.73 instead of $89.42. The high original cost of the plant ($714,-843.76), equal to $416.57 per arc equivalent, is $134.07 in excess of the cost of the Allegheny plant ($282.50 per arc equivalent), and probably $200 in excess of the cost in private plants which have commercial lighting. This brings the estimate for interest and depreciation to a figure much

higher than in other plants when computed on the total cost. The high cost includes underground construction and provision for large extensions in the future, when perhaps a commercial equipment will be installed. The actual cash cost of the lamps is a better basis of comparison. This was $64.18 in 1897, a decrease of $4.33 below the cost of the first year of operation ($68.52). Table XXXII. furnishes a comparison of certain street-plants which have been especially referred to in this chapter, with the charges paid to private companies by certain of the larger cities which come more nearly in the class with Allegheny and Detroit.

COMMERCIAL LIGHTING.

The foregoing comparisons have dealt mainly with American street-plants. But it is an unfair comparison which looks mainly at street-lighting. Even more important is the relief of the private consumers from exorbitant charges. The full significance of public ownership does not appear when we compare the prices charged by private companies for street-lighting with the cost of the same where the city owns its own street-plant without commercial attachment. The commercial lighting in large cities is more valuable than the public lighting, and companies usually give to the city better terms and lower rates than to the citizens for the same or equivalent service. The lower charge is in effect a franchise tax which is paid indirectly by the commercial customers of the electric company. The only failures of municipal

TABLE XXXII. Comparison of Municipal Street-Plants with Prices Paid to Private Companies.

Municipal Plants.	Date.	No. Lamps, 2,000 C. P.	Hours per Year.	Operating Expenses.	Insurance.	Interest on Bonds.	Depreciation, 3%.	Cost to City per Year.	Per Hour.	C. P. per Hour, 1 cent.
Batavia[1] . . . . w.w.	1897	103	3,407	$42.60	$1.24	$8.93	$7.49	$60.26	$.0177	1,136
Dunkirk[1] . . . . w.w.	1897	75	2,809	39.56	. .	0.53	8.40	49.49	.0176	1,137
Herkimer[1] . . . . w.w.	1897	64	3,079	50.97[4]	1.00	8.75	8.11	68.83	.0206	971
Watervliet[1]	1897	115	3,950	64.03	2.37	. .	6.74	73.14	.0185	1,081
South Norwalk[2]	1897	100[7]	2,156	36.62	. .	9.10	7.83[3]	53.56	.0248	484
Marshalltown, Ia.[2] . w.w.	1897	98[7]	1,600	12.50	. .	8.16	4.91	25.57	.0159	755
Allegheny[2]	1897	1,037	4,007	53.55	. .	. .	8.48	62.03	.0154	1,300
Detroit[2]	1897	1,716	3,791	64.18	. .	13.98	12.57	90.73	.0239	835
Detroit (Official)	1897	1,564	3,791	64.19	5.10[5]	18.28[6]	1.85	89.42	.0236	847
Private Plants.[8]										
Pittsburg	. .	1,700	3,650	. .	. .	. .	. .	96.00	.0263	760
Buffalo	. .	2,100	3,650	. .	. .	. .	. .	126.00	.0345	580
Columbus, O.	. .	990	2,179	. .	. .	. .	. .	74.50	. .	585
Indianapolis	. .	1,100	2,179	. .	. .	. .	. .	85.00	. .	511
Philadelphia	. .	6,500	4,000	. .	. .	. .	. .	109.00	.0270	734
								146.00	.0360	498
New York	. .	. .	4,000[7]	. .	. .	. .	. .	146.00	.0370	328
								164.00	.0401	328
								182.50	.0450	263
Syracuse, N.Y.	. .	1,100	4,000	. .	. .	. .	. .	91.25	.0228	877

[1] Personal investigation. [2] Based on municipal reports.
[3] Computed by the comissioners at 3.4 per cent. In other cases computed by the writer at 3 per cent, as stated.
[4] Includes *pro rata* of water-works expenses.
[5] Lost taxes. [6] Interest on total cost of plant.
[7] 1,200 C. P. each. [8] General Electric Bulletin, 4,112.

plants hitherto reported are those which furnished street-lighting alone, and the so-called greater success of the private companies which took the place of the municipal failures has been based on their commercial business. This will appear more clearly from Table XXXIII., where I have compiled, from the Report of the Massachusetts Board of Gas and Electric Light Commissioners, the comparative prices charged by all private companies for public and commercial arc lamps in the fifteen cities in that State for which complete reports are given. It appears, after making corrections in seven cases in order to bring all lamps to the all-night schedule for 2,000 c. p. lamps, that there are eleven of the fifteen cities in which commercial charges are 4 per cent to 107 per cent above public charges for the same or equivalent service, there are two cities in which charges are less, and two in which they are the same. Wiring and renewals, too, are generally charged extra to the commercial customers, but are always included in the price to the cities.

Arc lighting is a relatively small part of commercial service. The saving to consumers and profits to taxpayers come mainly from incandescent lighting. Incandescent lighting can be furnished at ten cents per kw.-hour, or ½ cent per lamp-hour of 16 c. p., — one-half the usual private rates, — and yield a large profit to the municipal plant. At

TABLE XXXIII. Comparative Prices Charged by Private Companies for Public and Commercial Arc Lamps.

City or Town. [Massachusetts.]	C. P.	Public Lamps.		Commercial Lamps.					Customers Pay for	
		Price.	Hours.	Price.	Hours.	Add for Common Basis.	Corrected.	Per Cent Higher than Street.	Wiring.	Renewals.
		$		$			$			
Brookline	2000	146.00	10.5	182.50	10.5	. .	182.50	25	No.	No.
Cambridge	1200	100.00	10.7	120.00	5.5	⅓	160.00	60	Yes.	Yes.
Chelsea	1200	109.50	11.2	140.00	5.5	⅓	186.66	71	?	Yes.
Franklin	1200	75.00	4.2	75.00 90.00	3.5 5.5	. .	. .	0 to 20	No.	No.
Hudson	1200	100.00	8 3	75.00	3.5	⅓	100.00	same.	Yes.	Yes.
Leominster	1200	72.00	6.3	72.00	4.5	. .	72.00	same.	Yes.	Yes.
Lynn	2000	146.00	10.7	108.00	5.5	⅓	144.00	less.	Yes.	No.
Northampton	1200	67.50	5.0	100.00	5.5	. .	100.00	50	?	No.
Pittsfield	1200	62.50	5.3	91.25 108.00	3	¼	114.00 128.25	84 107	Yes.	Yes.
Quincy	1200	75.00	5.1	78.00	Moon.	. .	. .	4	Yes.	Yes.
Salem	2000	146.00	10.6	131.10	4.5	⅓	178.37	22	Yes.	No.
Revere	1200	72.00	5.4	96.00	5.5	. .	96.00	33	?	No.
Taunton	1200	124.00	6.8	84.00	4.0	¼	105.00	less.	Yes.	No.
Waltham	1200	83.95	6.7	120.00 150.00	5.5	. .	120.00 180.00	43 75	?	Yes.
Worcester	2000	127.75	10.5	219.00	10.5	. .	219.00	72	Yes.	Yes.

this rate it is cheaper than gas, and more wholesome and convenient.

The city of Jamestown, N.Y., added its commercial plant after the street-plant had been operating a couple of years; and one large consumer, who had been paying $1,400 a year for lighting, now gets his light from the city for $900. A prominent social club had been paying $450 yearly for lighting its rooms. In order to retain its custom, the private company has reduced the charge for the same light to $120 a year. The city operates 275 street-lamps of 1,200 candle-power each an average of six hours per night, or 2,200 per year, and 1,200 sixteen candle-power incandescents in alleys and public buildings. The latter, at three hours per night, are equivalent to 100 arcs, making a total of 375–1,200 candle-power arcs. The operating expenses and insurance are $19,122.16; interest on bonds ($72,000 at 4 per cent), $2,880; depreciation on cost of plant ($74,000 at 3 per cent), $2,220; total cost, $23,967.16. The commercial income from 1,500 lamps is $5,913.89, leaving a net cost to taxpayers for public lamps of $18,053.27, or $18.14 per year, or $.0219 per lamp-hour. Comparing Jamestown with the only other cities of New York having more than 100 lamps of 1,200 candle-power furnished by contract with private companies, we have the accompanying table (Table XXXIV.). It shows that, without making correction for schedule, the candle-power for one cent in Jamestown considerably exceeds each of the others, while with the correction the excess is 50 to 150 per cent. The saving to the city is fully one cent per lamp-hour, or $22 per year for each lamp equivalent, or $8,250 for 375 lamps. Besides this, the commercial customers of the city pay $6,000 per year, which is a saving of $3,000 for them as compared with their former payments to the private

company. Further, the private company still furnishes 10,000 incandescents, 188 arcs, and 200 horse-power, on which the reductions in charges have been fully $10,000. The total saving to the city, therefore, has been probably $20,000 yearly.

TABLE XXXIV.

Cities.	No. of Lamps.	Schedule.	Hours per Year.	Cost per Lamp per Year.	Cost per Lamp-Hour.	Candle-Power per Hour for 1 cent.
				$	$	
Jamestown . .	375	Moonlight,	2,200	48.14	.0219	549
Jamestown . .	Corrected to All-night Schedule			60.17	.0146	712
Amsterdam. .	138	All-night,	4,000	98.00	.0250	480
Brooklyn . .	3,382	All-night,	4,000	124.10	.0310	387
Elmira . . .	240	All-night,	4,000	102.20	.0260	470
New Brighton.	100	All-night,	4,000	100.00	.0250	480
New York City,	3,643	All-night,	4,000	146.00 164.20 182.50	.0370 .0410 .0450	328 300 263
N. Tonawanda,	163	All-night,	4,000	90.00	.023	534

Lansing, Mich., bought out the private plant, and reduced rates at once from twenty cents per kw. to eighteen cents, and again to twelve cents, in two years. The city pays its municipal plant $10,000 yearly for 117 2,000 candle-power lamps, moonlight schedule, and the plant receives also $15,000 for private lighting, making a profit for the plant of $7,000 yearly above operating expenses and interest. The rates are twelve cents per kw., being a reduction of eight cents below the rates charged by the private company whose plant the city purchased. The saving to the citizens on commercial lighting is therefore approximately $10,000 per year.

TABLE XXXV. Municipal Plants with Commercial Service.

1 Cities.	2 Plant Established.	3 Cost to Date.	4 Bonds Outstanding.	5 Capacity of Plant.		6 Number Lights in Operation.				7 Operating Expenses.	8 Interest on Bonds.	9 Total Cash Expense.	10 Commercial Receipts.
						Public Lights.							
				Arc.	Incandescent.	Arc.	Incandescent.	Total Equiv.	Commercial Incandescents.				
		$	$							$	$	$	$
Jamestown, N. Y.[1]	1891	74,000.00	72,000	. .	. .	275–1,200	1,200–16	. .	1,500	19,122.16	2,880.00	22,002.16	5,913.89
Batavia, Ill.[2]	1891	30,452.00	. .	. .	. .	None	142–32	. .	4,495	5,464.06	. .	5,464.06	6,085.10
Logansport, Ind.[2]	1894	90,236.00	. .	160	. .	160	None	. .	. .	13,206.60	. .	13,206.60	17,442.53
Danville, Va.[2]	1887	25,000.00	. .	170	. .	119	None	. .	18	4,864.54	. .	4,864.59	1,401.56
Lansing, Mich.[3]	1892	50,000.00	50,000	. .	. .	117–2,000	None	. .	. .	18,685.90	2,500.00	21,185.90	15,540.08
Swanton, Vt.[3]	. .	42,707.63	. .	. .	. .	20–2,000	None	. .	. .	2,614.94	2,046.19	. .	4,158.05
Reading, Mass.[3]	. .	66,809.27	. .	150–1,200	1,350–16	123–1,200	None	. .	1,550	12,300.92	2,100.00	14,400.92	5,250.28
Marblehead, Mass.[3],	. .	81,226.30	. .	200–1,600	1,200–16	151–2,000	42/16-30	160–2,000	50-10 2,210 -16	11,000.00	2,400.00	13,400.00	4,350.94

TABLE XXXV. — *Continued.*

1 Cities.	11 Net Cash Cost of Public Lamps.	12 Cash Cost per Lamp.	13 Depreciation, 3%	14 Total Expense.	15 Net Cost of Public Lights, Including Depreciation.	16 Schedule of Street Arc Lamps.	17 Cost per Lamp-Year, Including Depreciation.	18 Cost per Lamp-Hour.	19 Candle-Power per Hour for 1 Cent.	20 Charges for Commercial Service.
	$	$	$	$	$	Hours.	$	$		
Jamestown, N.Y.[1] .	16,088.27	42.77	2,220.00	23,967.16	18,053.27	2,200	48.14	.0219	549	10–12½ Kw.
Batavia, Ill.[2] . . .	621.04[4]	Free	900.00	6,364.57	278.96	. .	1.96	. .	. .	. .
Logansport, Ind.[2] .	4,235.93[4]	Free	2,707.08	15,913.68	1,528.85[4]	All-night,	Free	. .	. .	5 c. Kw.
Danville, Va.[2]. . .	3,463.03	29.10	750.00	. .	4,114.59	Moon,	34.57	. .	. .	. .
Lansing, Mich.[3] . .	5,645.82	48.25	1,500.00	22,685.90	7,145.82	All-night,	61.07	.0152	1,315	12 c. Kw.
Swanton, Vt.[3]. . .	503.08	25.15	1,281.21	5,942.34	1,784.39	. .	89.22	. .	. .	⅛ c. lp. hr.
Reading, Mass.[3] . .	9,150.64	74.39	. .	16,405.19	11,154.91	2,482	90.93	.036¢	330	15 c. Kw.
Marblehead, Mass.,[3]	9,049.06	56.37	2,436.78	15,836.78	11,485.84	3,175	71.78	.0226	885	¾ c. lp. hr.

[1] Personal investigation. [2] Bulletin of League of Municipal Municipalities. [3] Municipal Reports. [4] Profit.

Logansport, Ind., established a municipal plant in 1894 at a cost of $90,000. The expenditures in 1897 were $18,946.75, of which $13,206.60 were for operation, and $5,740.15 for new construction. The commercial receipts were $17,442.53, or $4,235.93 in excess of operating expenses, and within $1,504.22 of the total expenditures. Adding $13,442.35, for lighting streets and public buildings, to the commercial receipts, and the income of the taxpayers for the year was $30,884.88, against an expenditure of $13,206.60. Depreciation would increase this to $15,900, leaving a profit of $15,000. The success of the plant has been so great that the rate for incandescent lighting has just been reduced to 5 cents per 1,000 watts, probably the lowest meter rate in the world.[1]

Batavia, Ill., installed a plant in 1891 at a cost of $30,000. No arc lamps are operated; but the plant furnishes 4,495 sixteen candle-power incandescent lamps to private parties, and 142 thirty-two candle-power for street-lighting. The total expense of operation in 1897 was $5,464.06, while the receipts from commercial lighting were $6,085.10, showing a profit of $621.04. Depreciation would be $900.

For comparison, the reports of these and certain other cities are given in Table XXXV. The inadequateness of this table is owing to the difficulty in getting complete information except by personal investigation. The basis of the data for each city is indicated.

MASSACHUSETTS EXPERIENCE.

The Massachusetts Board of Gas and Electric Light Commissioners in their report for January, 1898, have presented for the first time a computa-

[1] See Bulletin of the League of American Municipalities.

tion showing for each municipal plant in that State the cost per year to the city for each lamp employed in street-lighting. The table is reproduced on the following page, and the notes and explanations furnished by the Commission are given below.

TABLE XXXVI.

Municipal Electric Plants, Compiled by Massachusetts Board of Gas and Electric Light Commissioners, 1898.

"The following table is intended to show the cost per lamp per year of the street electric lights in the several municipalities, based upon the items shown, and upon the average daily number of lights used during the year, as given in the preceding table. The net loss in operating is the difference between the operating expenses and the income from commercial and domestic lighting; interest is the actual interest paid or accrued during the year; and depreciation is computed at 5 per cent upon the cost, as shown by the books.

"NOTE. — In the table as given, when lights of different candle-power are used in the same town, the cost of each is computed according to the amount of energy theoretically necessary, under average conditions, to maintain them at standard candle-power. Obviously this cost will be affected by the profit or loss on the commercial lighting. In Hudson $79.53, in Marblehead $1,216.68, and in Peabody $860, have been deducted from the totals given as the estimated value of light supplied to public buildings, and not in the operating accounts. In all other cases the value of such lighting has been included in the commercial lighting income."

TABLE XXXVI. — *Continued.*

Municipality.	Year of Beginning.	Net Loss in Operating.	Interest.	Depreciation, 5%.	Other Cost Items.	Total.	Cost per Lamp per Year.
Braintree	Streets, 1892 Commercial, 1894	$5,225.32	$1,617.00	$2,846.10	. .	$9,688.42	25 c. p. $20.53 1,200 c. p. 82.11
Chicopee	1896	8,421.83	3,400.00	4,514.99	. .	16,336.82	130.69
Danvers	Streets, 1889 Commercial, 1896	4,293.34	608.33	1,392.23	. .	6,293.90	74.05
Hingham	1895	4,815.45	713.33	925.82[1]	. .	6,524.60	18.43
Hudson	1897	766.86	360.00	520.88	. .	1,647.74	12.02[2]
Hull	1894	6,509.84	4,553.51	4,678.19	. .	15,741.54	61.73
Marblehead	1895	6,267.80	2,320.00	4,130.55	$177.16	12,895.51	30 c. p. 23.77 16 c. p. 10.91 25 c. p. 17.83 1,200 c. p. 71.82
Middleborough (with gas)	1893	2,715.55	1,992.67[3]	2,168.84[3]	407.78	7,294.84	25 c. p. 18.81 1,200 c. p. 75.24
Needham	1893	2,454.27	532.00	602.16	. .	3,588.43	11.58
North Attleborough	1894	3,648.80	2,000.00	2,570.15[1]	. .	8,218.95	14.05
Peabody	Street, 1892 Commercial, 1893	7,454.29	2,010.00	3,537.26	399.30	13,400.85	32 c. p. 26.18 1,200 c. p. 78.54
Reading	1895	5,985.74	2,370.00	3,205.68	. .	11,561.42	93.99
Wakefield (with gas)	1894	7,405.15	3,005.70[3]	3,347.35[3]	213.89	13,972.09	97.03
Wellesley	1892	4,191.54	473.34	719.68	. .	5,384.56	10.73

[1] Depreciation, less jobbing income.

[2] Cost per lamp for first five and one-half months' operation.

[3] Interest and depreciation, here stated, are the same per cent of total interest and depreciation as electric plant is of the total combined plant, as shown by the books.

The foregoing table, compiled by the Massachusetts Board of Gas and Electric Light Commissioners, gives the estimated net cost to the city for its public lamps, after deducting commercial income and allowing for interest on the debt and a depreciation of 5 per cent. This is the rate mentioned in the State law.

In Table XXXVII. I have computed the net cost on the basis of 3 per cent depreciation, as advocated in this paper. I have also added column 6, computed from the returns given in the Board's report from all the private electric companies of the State, showing the average prices paid to these companies for corresponding services. The averages have been computed in three divisions, according to the number of hours burning per night, as will be seen in the foot-note. Comparing these averages with my corrected costs (column 4), it will be seen that the cost to the city, with municipal operation, is less than the average price paid to companies in fifteen cases, and is more than the average in two cases. Compared with the estimates made by the Board in the preceding table, at 5 per cent depreciation, the municipal costs are less in thirteen and more in four cases. Chicopee and Hudson are omitted. The latter had been operating only five and a half months, and the former only eleven months. Chicopee purchased its street-plant from a company, and

then added an incandescent system, charging 11.85 cents per kw.-hour, whereas the ruling rates for private companies are 20 cents per kw.-hour.

TABLE XXXVII. Corrected and Compared with Private Charges in Massachusetts.

City or Town.	1 Depreciation, 3%.	2 Total Corrected.	3 C. P.	4 Corrected Cost Per Lamp.	5 No. Hours Per Night.	6 Average Paid Companies for Corresponding Service.[1]
Braintree . . .	$1813.74	$8656.06	25 1200	$13.34 73.35	7.9	$19.07 82.76
Chicopee	2685.00	14,506.83	1200	116.05	7.9	82.76
Danvers	1053.78	5955.11	1200	70.66	6.	82.76
Hingham . . .	709.80	6238.58	32	17.62	5.1	23.50
Hudson	312.53	1359.86	1200	97.13	5.2	74.00
Hull	2806.91	13,870.26	25	54.39	5.	16.88
Marblehead . .	2478.33	9849.45	30 16 25 1200	20.14 8.63 15.10 60.42	8.9	32.38 . . 23.57 103.91
Middleborough .	1298.30	6006.52	25 1200	15.99 63.98	7.5	19.07 82.76
Needham . . .	361.29	3347.57	25	10.79	4.9	16.88
N. Attleborough .	1542.00	7190.80	32	12.29	5.	23.50
Peabody	2122.20	10,726.49	32 1200	22.34 67.04	10.3	32.38 103.91
Reading	1923.37	10,279.07	1200	83.57	5.2	74.00
Wakefield . . .	2008.20	12,419.05	1200	86.24	4.9	74.00
Wellesley . . .	431.43	5096.31	25	10.15	4.9	16.88

[1] Average paid for 4 to 6 hours per night, 15 companies, 1,200 c. p., $74.00; 23 companies, 25 c. p., $16.88; 8 companies, 30 c. p., $23.50.

Average paid for 6 to 8 hours per night, 16 companies, 1,200 c. p., $82.76; 14 companies, 25 c. p., $19.07; 3 companies, 30 c. p., $19.00.

Average paid for 8 to 11 hours per night, 14 companies, 1,200 c. p., $103.91; 8 companies, 25 c. p., $23.57; 6 companies, 30 c. p., $32.38.

Note by the Editor. — It will be noticed that, according to Table XXXVII., eight towns, Danvers, Hingham, Marblehead, Middleborough, Needham, North Attleborough, Peabody,

and Wellesley, provide themselves with light cheaper than the average charge under private ownership, even if 5 per cent be allowed for depreciation; while another town, Braintree, secures cheaper light if depreciation be reckoned at 3 per cent, as it probably should be, and about the same if depreciation is reckoned at 5 per cent. The other five of the fourteen towns, Chicopee, Hudson, Hull, Reading, and Wakefield, are at higher expense for public lighting than the average charge under private ownership; but the first two had been running less than a year, and therefore should be excluded from the comparison. Respecting the other three, it may be noticed that in Hull, the smallest town of the group, with only 1,044 population, and too small, therefore, for comparison with the average private companies, the meter charge was 18.75 cents per kw.-hour, less 20 per cent for prompt payment, as compared with the charge in fifty private companies of the State, of much larger size, of 20.2 cents.

In Reading the charge for commercial light is only $\frac{3}{4}$ cent per lamp-hour, which is about the same as 13 to 15 cents per kw.-hour. In Wakefield the charge for commercial light is one cent per ampere-hour, which is equivalent to about 20 cents per kw.-hour.

The following table, XXXVII*a*, covers certain other facts in the tables of the Massachusetts Report.

In comparing the figures for all these cities, it must be remembered that the cost to the city is not the only consideration. The rates charged for commercial service are 25 to 35 per cent less than the rates charged by companies. Fifty companies report rates from 15 to 28 cents per kw.-hour, averaging 20.2 cents, against municipal rates of 10 to 20 cents, averaging 14.46 cents. Twenty companies report lamp-hour rates for 16 c.p., of which sixteen charge one cent per lamp-hour, three charge

1¼ cent, and one charges $\frac{6}{10}$ cent, against municipal rates of $\frac{6}{10}$ in one city, $\frac{7}{10}$ in three, and one cent in one, averaging 7.7 mills or $\frac{77}{100}$ cent. The contract rates are so various that no averages can be computed, but the ratio will hold about the same as for kw.-hour and lamp-hour. Were the cities to charge as high as private companies, they could probably make a better showing on street-lamps, but this would be to deprive themselves of one of the main advantages of municipal ownership.

RATES TO PRIVATE CONSUMERS.

These favorable showings for municipal plants are not based on high charges. Table XXXVIII. gives comparative charges for commercial lights under public and private ownership. A comparison of these rates shows that private companies charge for commercial lighting 50 to 100 per cent more than municipal plants. The lowest meter rate charged by private companies is in Syracuse, — 10 cents per kw., — whereas the usual rate is 20 cents per kw., or its equivalent, 1 cent per meter-hour. The lowest rates charged by cities are $\frac{3}{10}$ of a cent per lamp-hour in Newark, Del., and 5 cents per kw. in Logansport, Ind.; but the usual rate is $\frac{1}{2}$ cent per meter-hour, and 7 to 10 cents per kw., and 35 to 50 cents per month, against 75 cents to $1.25 per month with private companies.

TABLE XXXVIIa.

1 City or Town.	2 Population.	3 Commercial Incandescents.	4 C. P.	5 Price, Incandescents.	6 Public Arcs.	7 Public Incandescents.	8 C. P.	9 Hours.
Braintree	5,311	4,258	16	$0.64	91, 1,200 C. P.	108	25	2,654
Chicopee	16,420	2,548	16	.118 Kw.-Hour.	125, 1,200 C. P.	..	..	2,700
Danvers	8,181	1,675	16	.10 Kw.-Hour.	85, 1,200 C. P.	..	..	1,800
Hingham	4,819	3,207	16	.20 Kw.-Hour.[1]	. . .	354	32	1,561
Hudson	5,308	284	16	.20 per Hour.	14, 1,200 C. P.	..	..	789
Hull	1,044	3,583	16	. . .[2]	. . .	255	25	1,440
Marblehead	7,671	2,750 152 16	16 10 32	¾ c. per Hour.[3]	151, 1,200 C. P.	53	25[4]	1,929
Middleborough	6,689	1,881	16	.20 Kw.-Hour.	95, 1,200 C. P.	..	..	1,875
Peabody	10,507	3,500	16	55 v. Lamps, ¾ c. 104 v. Lamps, 1½ c.	157, 1,200 C. P.	8	32	3,757
North Attleborough	6,576	2,490	16	¾ c. per Hour.	. . .	582	32	1,596
Reading	4,717	2,594	16	¾ c. per Hour.	123, 1,200 C. P.	..	..	1,486
Wakefield	8,304	2,300	16	1 c. per Amp.-Hour.	144, 1,200 C. P.	..	..	1,382

[1] Twenty per cent discount on payment, but to summer residents 25 cents.

[2] One to 75 in number, price 93 cents each per month till midnight; but dining-room, kitchen, etc., light not to burn so late. Meter rates yearly 93 cents per hour, or $18.75 per Kw. Twenty per cent discount before the 10th.

[3] Three-fourths cent to yearly consumers and to summer users of over $20.00 ; 1 cent to others.

[4] Four cents were 25 C. P., 10 were 16 C. P., 3 were 30 C. P.

TABLE XXXVIII.[1] **Commercial Rates for**

MUNICIPAL PLANTS.			
CITY OR TOWN.	PER MONTH.	LAMP-HOUR.	PER KW.-HOUR.
Braintree, Mass.	. . .	$\frac{6}{10}$ c.	. . .
Chicopee, Mass.	. . .	. . .	11.85 c.
Hingham, Mass.	. . .	. . .	20 c. Yearly, 25 c. Summer.
Hull, Mass.	60 c.	1 c. Amp.-Hour.	. . .
Marblehead, Mass.	. . .	$\frac{3}{4}$ c. Yearly, 1 c. Summer.	. . .
Middleborough, Mass.	. . .	1 c.	. . .
N. Attleborough, Mass.	. . .	$\frac{3}{4}$ c.	. . .
Reading, Mass.	. . .	$\frac{3}{4}$ c., $1\frac{1}{2}$ c. Amp.-Hr.	15 c.
Wakefield, Mass.	90 c.	$\frac{6}{10}$ c. Amp.-Hr.	. . .
Jamestown, N.Y.	$67\frac{1}{2}$ c. All-night; 40 c. to 10 P.M.	. . .	9 c. dwellings, $10\frac{1}{4}$ factories.
Lansing, Mich.	75 c.	. . .	12 c.
Johnson, Vt.	. . .	$\frac{1}{3}$ c.	. . .
Swanton, Vt.	. . .	$\frac{1}{3}$ c.	. . .
Griffin, Ga.	. . .	. . .	12 c.
Logansport, Ind.	. . .	. . .	5 c.
Webster City, Ia.	(av.) 38 c.	. . .	10 c.
Lisbon, Ia.	40 c.	$\frac{3}{4}$ c.	. . .
St. Charles, Ill.	50 c.	. . .	15 c.
Benton, Ill.	50 c.	. . .	. . .
Harrington, Kan.	75 c.	. . .	. . .
Tecumseh, Neb.	$1.25 (1st 2); 50 c. (above 4)	. . .	. . .
Savannah, Mo.	50 c.	. . .	15 c.
Fulda, Minn.	50 c.	. . .	. . .
Salisbury, Mo.	10 P.M., 60 c. 12 P.M., 80 c.	1 c.	20 c.
Alexandria, Minn.	65 c.	. . .	15 c.
Waseca, Minn.	. . .	. . .	15 c.
Luverne, Minn.	. . .	. . .	10 c.
Wells, Minn.	50 c.	. . .	10 c.
Litchfield, Minn.	40 c.	$\frac{2}{3}$ c.	. . .
St. Peters, Minn.	9 P.M., 50 c. 12 P.M., 65 c.	. . .	$12\frac{1}{2}$ c.
Rochester, Minn.	. . .	$\frac{1}{2}$ c.	. . .

Incandescent Lamps — 16-Candle Power.

PRIVATE PLANTS.			
CITY OR TOWN.	PER MONTH.	LAMP-HOUR.	PER KW. HR.
Abington, Mass. . .	. . .	$\frac{9}{10}$ c.	18 c.
Adams, Mass. . . .	6 Nights per Week, $1.00.	1 c. Amp.-Hour	20 c.
Amesbury, Mass. . .	90 c.	. . .	. . .
Amherst, Mass. . . .	. . .	. . .	20 c.
Andover, Mass. . . .	. . .	. . .	24 c.
Athol, Mass.	. . .	. . .	20 c.
Attleborough, Mass. .	90 c.	. . .	25 c.
Beverly, Mass. . . .	$1.16⅔ for 7 Nights, $1.00 for 6 Nights.	. . .	25 c.
Block Plant, Mass. .	. . .	. . .	16⅔ c.
Blue Hill, Mass. . .	$10.00 per Year.	1 c.	. . .
Boston, Mass. . . .	. . .	1 c.	20 c.
Bridgewater, Mass. .	. . .	1 c.	20 c.
Lansing, Mich. . . . Prior to 1895.	75 c. to 9 P.M., $1.00 to 12 P.M.	. . .	. . .
Syracuse, N.Y. . . .	. . .	. . .	10 c.
Little Rock, Ark. . .	. . .	1 c.	. . .
Colorado Springs, Col.	. . .	1 c.	. . .
Leadville, Col. . . .	$1.00	1¼ c.	. . .
Logansport, Ind. . .	. . .	1 c.	. . .
San Jose, Cal. . . .	. . .	1¼ c.	. . .
Baton Rouge, La. . .	50 c.	. . .	. . .
Marseilles, Ill. . . .	40 c.	. . .	. . .
Chicago, Ill.	. . .	1 c.	. . .
Wichita, Kan. . . .	. . .	1 c.	. . .
Topeka, Kan. . . .	. . .	1 c.	. . .
St. Louis, Mo. . . .	. . .	1–1¼ c.	. . .
Duluth, Minn. . . .	. . .	1 c.	. . .
Springfield, Mo. . .	. . .	1 c.	. . .

[1] The figures for Massachusetts are taken from the Report of the Gas and Electric Light Commissioners. Those for cities outside Massachusetts are from reports made to me or to the South Norwalk investigating committee, or they have been collated by Mr. Parsons in the *Arena*, August, 1895.

TABLE XXXVIII.

MUNICIPAL PLANTS.—*Continued.*

City or Town.	Per Month.	Lamp-Hour.	Per Kw.-Hour.
Marshall, Minn.	. . .	$\frac{6}{10}$ c.	. . .
Coldwater, Mich.	. . .	$\frac{8}{10}$ c.	11 c.
Evart, Mich.	35 c.	. . .	. . .
Hamilton, N.Y.	. . .	$1\frac{1}{2}$ c.	. . .
Westfield, N.Y.	50 c.	$\frac{1}{2}$ c.	. . .
Madison, N.J.	. . .	. . .	10 c.
Newark, Del.	. . .	$\frac{3}{10}$ c.	. . .
Hamilton, Ohio	60 c.	. . .	8 c.
Jackson, Ohio	60 c.	. . .	10 c.
Willoughby, Ohio	(Stores) 25 c.	. . .	8 c.
DeGraff, Ohio	25c.–40 c.	$\frac{6}{10}$ c.	. . .
Galion, Ohio	70 c. to 10 lamps, 65 c. to 16 lamps.	. . .	10 c.
Quakertown, Pa.	. . .	. . .	12 c.
Schuylkill Haven, Pa.	25 c.–65 c.	. . .	. . .
Sharpsburg, Pa.	. . .	. . .	8 c.
Wytheville, Va.	25, 50, 75 c., All-night.	. . .	. . .
Salem, Va.	40 c.–65 c.	. . .	20 c.
Rice Lake, Wis.	50 c.	. . .	20 c.

American cities have not had enough experience in commercial lighting to show the possibilities of this branch of service. The first year or two must usually be expected to incur a loss. This was true of British cities, but the remarkable financial results which those cities have attained in the third and succeeding years of their commercial business are a promise of even more brilliant results in America. The pioneer municipalities which we have already cited, like Logansport, Ind., Batavia, Ill., and Jamestown, N.Y., are revealing

— *Continued.*

PRIVATE PLANTS.			
CITY OR TOWN.	PER MONTH.	LAMP HOUR.	PER KW. HR.
Bath, Me.	. . .	1 c.	. . .
Birmingham, Conn. .	. . .	. . .	20 c.
Omaha, Neb.	. . .	. . .	20 c.
Binghamton, N.Y. .	. . .	1 c.	. . .
New York City, N.Y.	. . .	1 c.	. . .
Brooklyn, N.Y. . .	. . .	1 c.	. . .
Cincinnati, Ohio . .	. . .	$\frac{3}{4}$ c.	15 c.
Mount Holly, N.J. .	. . .	$\frac{1}{2}$ c.	. . .
New Brunswick, N.J.	. . .	$\frac{8}{10}$ c.	16 c.
Washington, D.C. . .	. . .	. . .	15 c.
Philadelphia, Pa. . .	. . .	$\frac{3}{4}$ c.	15 c.
Harrisburg, Pa. . .	. . .	. . .	15 c.
Wilmington, Del. . .	10 c. not over 1 Hour, $1.00 Lamp; 60-80 c. for 3 or more.	$\frac{6}{10}$ c.	. . .

unexpected and surprising benefits for citizens and taxpayers in the line of electrical supply. Not until cities undertake the work can we hope for such a low rate that the use of electricity can become universal, and the homes and shops can be abundantly supplied, not only with light, but also with power for all small machinery.

BRITISH EXPERIENCE.

While the preceding pages have been devoted mainly to American cities, the argument for municipal ownership is notably strengthened when we examine the electrical enterprises of the cities of Great Britain. With the careful and business-like

TABLE XXXIX.

Public and Private Costs, Charges, and Profits per Kilowatt-hour. — Great Britain.

1 Municipal Corporation.	2 Generation. Total.	3 Distribution.	4 Rents. Rates. Taxes.	5 Management.	6 Miscellaneous.	7 Total Cost.	8 Average Revenue.	9 Gross Profit.	10 Total Kw. Sold.	11 Price Charged.
	$	$	$	$	$	$	$	$		
Aberdeen	.0310	.0026	.0080	.0104	.0018	.0538	.0990	.0452	210,185	.10 *w.*
Bedford	.0498	.0014	.0036	.0062	.0046 [2]	.0656	.0892	.0246	158,238	.12.
Belfast	.0550	.0020	.0074	.0138	.0004	.0786	.1260	.0474	149,721	.14 and .08 *w.*
Blackburn	.0230	.0022	.0054	.0192	.0024	.0522	.1026	.0504	157,000	.12 and .06 *w.*
Bolton	.0390	.0008	.0058	.0092	.0014	.0562	.0960	.0398	186,957	.08 to .11 *w.*
Bradford	.0200	.0022	.0044	.0090	.0006	.0362	.0932	.0570	813,623	.04, .05 and .10.
Brighton	.0248	.0060	.0042	.0070	.0084 [2]	.0504	.0968	.0464	1,388,821	.14 and .03.
Bristol	.0292	.0042	.0076	.0092	.0048 [2]	.0550	.1062	.0512	650,758	.12 and .08 w. disc.
Burnley	.0270	.0012	.0052	.0098	.0004 [2]	.0436	.0946	.0510	211,517	.10 & .06 *w.* with 5% disc. *w.*
Burton-on-Trent	.0868	.0012	.0058	.0064	.0016	.1018	.1200	.0182	58,189	.12.
Coventry	.0736	.0004	.0074	.0366	.0030	.1210	.1146	.0064 [5]	51,184	.12 *w.*
Dewsbury	.0360	.0012	.0038	.0146	.0014 [2]	.0570	.1156	.0586	150,876	.12 and .06 *w.*
Dublin	.0662	.0032	.0034	.0070	.0116 [2]	.0914	.1104	.0190	476,547	.14.
Edinburgh	.0198	.0016	.0046 [3]	.0074	.0054 [2]	.0388	.0884	.0496	888,335	.10 and .06.
Halifax	.0488	.0016 [1]	.0074	.0114	.0020	.0712	.1110	.0398	177,531	.12.
Hampstead Vestry	.0470	.0024	.0038	.0114	.0070 [2]	.0716	.1144	.0428	547,920	.12 and .08.
Hanley	.0358	.0042	.0030	.0070	.0038 [2]	.0538	.0844	.0306	247,881	.10 with disc.
Huddersfield	.0240	.0036	.0050	.0160	.0008 [2]	.0494	.1016	.0522	304,163	.12 (less disc.) and .045.

Kingston-upon-Hull	.0270	.0038	.0036	.0096	.0012	.0452	.1092	.0640	463,796	.11 or .12 *w.* & .06 (lighting) .08 (other).
Kingston-on-Thames	.0624	.0084	.0024 [3]	.0118	.0002	.0852	.0900	.0048	155,681	.12 to .08 *w.*
Lancaster	.0364	.0022	.0038	.0078	.0046 [2]	.0548	.0948	.0400	106,125	.10 and .08.
Leicester	.0524	.0062	.0058	.0112	.0006	.0762	.1200	.0438	169,688	.10.
Manchester	.0166	.0024	.0040	.0058	.0038	.0326	.0960	.0634	2,508,588	.12.
Nottingham	.0254	.0006	.0038	.0126	.0010 [2]	.0434	.1138	.0704	297,185	.06, .09, and .12.
Oldham	.0308	.0088	.0050	.0096	.0010	.0552	.1132	.0580	227,982	.12 and .09 *w.*
Portsmouth	.0234	.0038	.0020	.0056	.0076 [2]	.0424	.0784	.0360	839,392	.10.
St. Pancras Vestry	.0428	.0142	.0026	.0108	.0070 [2]	.0774	.1058	.0010	1,188,629	.12, .10, and .03.
Southampton	.0410	.0042	.0046	.0206	.0028	.0732	.1240	.0508	131,843	.14.
Stafford	.0350	.0102	.0146	.0046	.0032	.0676	.1278	.0602	43,619	.14 and .08 *w.*
Sunderland	.0398	..	.0094	.0158	..	.0650	.0818	.0168	146,440	.12 and .10 *w.* disc. Power .06 and .05.
Taunton	.0492	.0016	.0024	.0160	.0110 [2]	.0802	.1092	.0290	126,840	.12 to .07.
Tunbridge Wells	.0432	.0012	.0022	.0088	.0134 [2]	.0688	.1144	.0456	174,053	.12 and .06.
Walsall	.0402	.0046 [1]	.0120	.0204	.0036 [2]	.0808	.1100	.0292	67,170	.12 and .08.
White Haven	.0264	.0018	.0018	.0042	.0080 [2]	.0422	.0666	.0244	178,378	.10 and .06.
Wolverhampton	.0372	.0004	.0026	.0118	.0066 [2]	.0586	.1072	.0486	224,709	.12 and .06.
Worcester	.0296	.0010	.0010	.0068	.0070 [2]	.0454	.0644	.0190	333,644	.02, .03, .04, .06, .10 *w.*
Yarmouth	.0488	.0014	.0020	.0122	.0100 [2]	.0744	.0932	.0188	157,254	.12 and .07.
Average	.0391	.0033	.0050	.0115	.0043	.0626	.1023	.0393	388,391	

[1] Includes proportion of salaries.
[2] Includes public lamps.
[3] Includes insurance.
[5] Loss.
w. Wright's indicator used.

TABLE XXXIX. — *Continued.*

1 Private Company.	2 Generation. Total.	3 Distribution.	4 Rents. Rates. Taxes.	5 Management.	6 Miscellaneous.	7 Total Cost.	8 Average Revenue.	9 Gross Profit.	10 Total Kw. Sold.	11 Price Charged.
	$	$	$	$	$	$	$	$		
Birmingham	.0324	.0010	.0066	.0142	.0002	.0544 [4]	.1108	.0564	756,428	.14 and .10.
Bournemouth	.0690	.0136 [1]	.0034	.0130	.0028	.1018	.1294	.0276	281,310	.14.
Cambridge	.0534	..	.0050	.0174	..	.0758	.1300	.0542	197,615	.14 *w.* disc.
Charing Cross and Strand	.0288	.0048 [1]	.0048	.0070	.0004	.0458	.0940	.0482	1,944,402	.12 and .10.
Chelsea	.0314	.0054	.0102	.0156	.0020	.0646	.1176	.0530	813,764	.12.
Dover	.0644	.0048	.0034	.0240	.0058 [2]	.1024	.0836	.0188 [5]	154,200	.14 and .06 *w.*
Eastbourne	.0658	.0082 [1]	.0054	.0134	.0052	.0980	.1438	.0458	208,096	.16.
Hastings	.0666	.0022 [1]	.0050	.0092	.0060 [2]	.0890	.1164	.0274	283,000	.12 *w.*
House to House	.0408	.0016 [1]	.0064	.0122	.0016	.0626	.1210	.0584	643,693	.12 and .10.
Hove	.0506	..	.0054	.0232	.0022	.0814	.1476	.0662	200,562	.16 and .08 *w.*
Kelvenside	.0314	..	.0152	.0314	.0040	.0820	.0936	.0116	63,467	.12.
Kensington and Knightsbridge	.0302	.0042 [1]	.0078	.0096	.0036	.0554	.1088	.0534	1,514,729	.12.
National (Preston)	.0226	.0018	.0044	.0088	.0032 [2]	.0408	.0976	.0568	320,500	.14 and .08 *w.* *w.* disc.
Newcastle and District	.0278	.0044 [1]	.0054	.0072	.0012	.0460	.0828	.0168	..	.12 and .06.
Newcastle-on-Tyne	.0266	.0048 [1]	.0026	.0092	.0040 [2]	.0472	.0836	.0384	535,953	.09.
Northampton	.0568	.0034	.0026	.0098	.0018	.0744	.1386	.0642	89,445	.16 and .08 *w.*
Notting Hill	.0350	.0008	.0054	.0320	.0060	.0792	.1532	.0740	230,787	.16 (100 volts). .12 (200 volts).
Oxford	.0404	.0030	.0054	.0180	.0024	.0692	.1206	.0514	291,640	.14 (less 2½ per cent. disc. for cash).

Pontypool	.0642	..	.0110	.0090	.0014	.0856	.1200	.0344	35,011	.12.
Reading	.0718	.0054 [1]	.0110	.0134	.0028	.1044	.1200	.0156	82,250	.12.
Richmond (Surrey)	.0522	.0078 [1]	.0168	.0138	.0098	.1004	.1392	.0388	97,044	.14.
St. James and Pall Mall	.0270	.. [6]	.0054	.0120	.0016	.0460	.1078	.0618	2,401,431	.12 (with rebates).
Scarborough	.0532	.0042 [1]	.0024	.0118	.0042	.0758	.1194	.0436	175,514	.10½ to .13.
Westminster	.0258	.0020	.0050	.0103	.0008	.0444	.1112	.0668	3,503,054	.12 (lighting). .08 (induc.)
Yorkshire Ho-to-Ho	.0248	..	.0016	.0082 [3]	..	..	.0960	..	701,409	.11 to .12(disc.)
Averages	.0425	.0044	.0063	.0102	.0029	.0719	.1162	.0443	671,902	

[1] Includes proportion of salaries.
[2] Includes public lamps.
[3] Includes insurance.
[4] Does not include insurance and law charges.
[5] Loss.
[6] Included in generation.
w. Wright's indicator used.

administration of those cities, the problem can be approached more nearly on its merits. That the decision is overwhelmingly in favor of public ownership may be inferred from the fact that, of the 84 applications before the Local Government Board in January, 1898, for "Electric Lighting Provisional Orders," 64 were made on the part of municipalities and urban or rural communities, and but 20 on the part of the private companies, and of this 20, there were 7 which were applications for extensions, leaving only 13 new private enterprises, against 64 new municipal ones.[1]

The substantial ground for this preference, as

[1] See *The Electrician,* Jan 7, 1898.

well as an interesting contrast with American enterprises, will be seen in Table XXXIX., where I have compiled, from Garcke's "Manual of Electrical Undertakings" for 1898, the costs, charges, and profits per kilowatt-hour of product sold in public and private undertakings. It appears, from columns 9 and 11, that the average charge for service by cities (10.23 cents per kw.) is 12 per cent less than the charges made by companies (11.62 cents per kw.), whereas in American cities the charges are 40 to 50 per cent less. This shows, as we have already noted, the strong emphasis on profit-making by municipal undertakings, contrasted with the American policy of low charges and extensive use. The gross profit per kw. in British public plants (3.93 cents) is 40 per cent of the revenues, and is less than the apparent profit in private undertakings (4.43 cents per kw.). While the operating expenses of private companies are 7.19 cents per kw. sold, they are only 6.26 cents with municipal undertakings. The difference — .93 cents per kw. — is equal to $16.74 per year on an estimated consumption of 1800 kw. per year for an all-night arc lamp of 2000 c. p. in favor of the municipal enterprises. And yet the cost of production in the private enterprises should be much less than in the public ones, since the average output per year is nearly double.

In Table XL. the operating expenses of the two

TABLE XL. Comparison of Operating Expenses per Kw.

Cities.	Year Ending.	Total Kw. Generated at the Station.	Labor. $	Fuel. $	Supplies. $	Repairs. $	Office. $	Miscellaneous. $	Total. $
Allegheny	Mar. 1, 1897	2,711,631	.0108	.0060	.0064	.0026	.0014	. .	.0272
Detroit	June 30, 1897	2,980,412	.0222	.0055	.0043	.0017	.0033	. .	.0370
14 American Municipal Stations (Foster) . .	. . .	. .	.0251	.0173	Miscellaneous.			.0161	.0585
Glasgow	Mar. 3, 1896	1,279,687	.0088	.0083	.0018	.0088	.0069	.0009	.0355
Manchester	Mar. 3, 1897	3,028,357	.0044	.0066	.0015	.0055	.0049	.0013	.0242
Dublin	Dec. 31, 1896	718,074	.0172	.0213	.0032	.0080	.0049	.0004	.0550
Aberdeen	Dec. 31, 1896	236,649	.0097	.0046	.0017	.0137	.0093	.0022	.0411
23 English Stations (Crompton)	. . .	. .	.0144	.0222	Miscellaneous.			.0194	.0560
Ideal English Station (Crompton)	. . .	. .	.0040	.0054	Miscellaneous.			.0170	.0264

largest American municipal stations which have published the records of their output in kilowatt-hours are compared with the four cities, Glasgow, Manchester, Dublin, and Aberdeen (on the basis of the total kilowatts *generated*, not *sold*, as in Table XXXIX.), and with Foster's estimate for the fourteen American municipal stations noted above in Table XXI., and his citation of Crompton's English stations. The high labor cost of the American stations is noticeable; but, notwithstanding labor in Allegheny and Detroit is 145 per cent and 405 per cent higher than in Manchester, and the cost of fuel is but slightly different, yet the total cost for the American cities is but 10 per cent higher than that of the model British municipality, and but little above Crompton's ideal English station. Manchester is the recognized banner municipality of Great Britain in electrical supply, the cost of operation being materially below that of all other cities. The smaller American cities, although bearing nearly double the labor cost, have a total cost less than 5 per cent above the twenty-three English stations.

QUALITY AND "OUTAGES."

Nothing has been said heretofore as to the quality of service rendered by public and private plants. It has been assumed, in the comparisons that have

been made, that the quality was uniform in all cases. But it must be remembered that there are two qualifications necessary before we can know that the candle-power, for example, is relatively as great as it appears. These are the quality of the light and the "outages." In every municipal plant, almost without exception, the people of the locality are found, on personal inquiry, to speak in enthusiastic terms of the superior quality of light they are getting. Unfortunately this field of electric lighting has not been adequately tested; and but few cities, either with public or with private plants, have any record of photometric tests of the efficiency of their lights. The candle-power is the "nominal" 2,000 candle-power of French standard, which Slingo & Brooker[1] estimate as giving actually only 875 candle-power when the current is ten amperes and the voltage fifty, so that this amount of light is produced at a cost of 500 watts. As the usual power varies from 425 to 475 watts per lamp, and municipal officials never, as far as I know, are provided with photometric appliances, it is within the power of private companies to diminish the candle-power below the standard required in their contracts. As long as exact measurements are lacking, we are compelled to depend upon the common opinion of the locality, which is indeed not an accurate judge.

[1] *Electrical Engineering*, London, 1895, p. 594.

This general satisfaction of citizens in their light is one of those local factors which statistics cannot present, but which go far in determining the preference for municipal plants. Dunkirk is given by Francisco as furnishing 718 candle-power per hour for one cent; but taking into account the fact that the dynamos there are run at eighteen amperes, and 520 watts are delivered to each lamp, and that the general impressions of citizens and visitors unite in describing them as the brightest lights to be found anywhere in street-lighting, it is evident that, in addition to his manipulation of costs, his estimate of quality also does injustice to the plant.

In the matter of "outages," too, the records for private plants are usually quite imperfect. Deductions are made from the contract price before payment is made by the city; but here is room for the political influence of the companies. The policemen are usually required to report outages; and in Syracuse the convenient practice obtains of reporting to the electrical company, which then reports to the city on its own outages.

For the city of Detroit the following comparison is made, by the Public Lighting Commission, of the outages under private and under municipal operation. (Table XLI.)

TABLE XLI.

Contractor Operating 1,279 Lamps, 1893–94.

Month.	No. Lamps Out.	Hours Out.	Per Cent Lamps Out.	Per Cent Hours Out.
October	1,319	6,825	3.326	1.500
November . . .	1,372	11,988	3.575	2.455
December . . .	2,710	20,485	6.835	3.867
January	787	4,304	1.985	0.834
February . . .	2,898	17,642	8.092	4.131
March	1,177	5,317	2.943	1.270
April	1,729	8,930	4.506	2.551
May	1,273	4,833	3.211	1.543
June	1,679	6,102	4.375	2.186

City Plant Operating 1,483 Lamps, 1895–96.

Month.	No. Lamps Out.	Hours Out.	Per Cent Lamps Out.	Per Cent Hours Out.
October	152	1,040	0.335	0.201
November . . .	95	774	0.266	0.137
December . . .	138	940	0.300	0.154
January	47	372	0.116	0.062
February	42	301	0.098	0.059
March	28	235	0.061	0.048
April	84	350	0.179	0.088
May	63	283	0.138	0.080
June	25	137	0.056	0.042

The following table, compiled from the reports of the commission, shows the remarkable improvement which the municipal management has effected in the course of two years in the matter of outages, and shows that a municipal plant, in the quality of its service, is more likely to improve by experience than a private plant. (Table XLII.)

TABLE XLII. Outages, Detroit Municipal Lighting.

Month.	Number Lamps.		Total of Lamp Hours Scheduled.	Total of Lamp Hours Out.
	Private.	Public.		
July, 1895 . .	590	700	163,257	2,426.33
August, " . .	590	727	191,322	1,839.02
September, " . .	590	814	242,598	4,239.28
October, " . .	. .	1446	519,462	1,040.10
November, " . .	. .	1483	577,075	773.34
December, " . .	. .	1498	629,013	940.29
January, 1896 . .	. .	1493	607,517	371.38
February, " . .	. .	1481	510,790	301.30
March, " . .	. .	1479	476,000	234.41
April, " . .	. .	1479	396,965	349.41
May, " . .	. .	1477	346,649	283.18
June, " . .	. .	1480	316,291	148.05
July, " . .	. .	1484	340,138	134.34
August, " . .	. .	1492	389,958	288.53
September, " . .	. .	1512	449,801	96.23
October, " . .	. .	1562	551,863	157.54
November, " . .	. .	1585	604,805	88.19
December, " . .	. .	1590	660,023	80.01
January, 1897 . .	. .	1594	642,115	92.22
February, " . .	. .	1589	537,783	73.18
March, " . .	. .	1589	530,845	95.22
April, " . .	. .	1590	434,804	217.19
May, " . .	. .	1589	385,922	32.54
June, " . .	. .	1593	345,243	13.48

If we compare individual months under private and public ownership, we have, for example, the following. (Table XLIII.)

TABLE XLIII. Outages, Detroit.

January,	1894.	6,304 hours out.	Private.
January,	1896.	371 "	Public.
January,	1897.	92 "	Public.
June,	1894.	6,102 "	Private.
June,	1896.	148 "	Public.
June,	1897.	13 "	Public.

TABLE XLIII. — *Continued.*

April,	1894.	8,930 hours out.	Private.
April,	1896.	349 "	Public.
April,	1897.	217 "	Public.
December,	1893.	20,485 "	Private.
December,	1895.	940 "	Public.
December,	1896.	80 "	Public.

It is also true that a steady improvement has been shown for the second year of municipal ownership, 1896–1897, both in absolute amounts and relatively as well. A comparison of individual months shows the same superiority of public over private ownership. Not only does the city of Detroit get a steadier light, but the brilliancy of the same is greater than that obtained from private corporations. The amount of the current used is maintained at 9.6 amperes, and the lamps burn at their full rated candle-power.

Such facts as these not only may give us confidence that municipal enterprise does better work than private companies in the field of electric lighting, but they also lead us to look with suspicion upon any statistics favoring private operation which are based upon candle-power cost, even if conscientiously compiled.

POLITICS.

The foregoing statistical comparisons may be taken as indicative that the great majority of the three hundred cities and villages now furnishing light are actually getting better service at less cost than those which depend upon private companies. It is objected that such cannot be the case, espe-

cially in our large cities, because of the flagrant municipal corruption and inefficiency. Business ability and integrity, it is said, are excluded from municipal office, appointments are made as a reward of political service, and the municipal plant soon becomes burdened with barnacles who draw pay without work. I do not deny that such is often the case. But I maintain that nine-tenths of the existing municipal corruption and inefficiency result from the policy of leaving municipal functions to private parties; and that an essential part of the present unparalleled awakening of civic conscience on the part of all classes of the people is the desire for municipal ownership of franchises. As the people become aroused to the degradation of their politics and to the need of reform, their attention is concentrated on the chief source of that degradation, the underhanded and often high-handed domination of city officials and machine politics by the corporations whose life is maintained by city franchises. It is from them that the politicians get their campaign funds. Contrast the results of municipal ownership above given with the following:—

In a city of 100,000 population a private company is organized in the early days of electric lighting with a capital of $100,000, supposed to have been actually paid up. In 1889 the company is "reorganized," increasing its capital by $130,000, $50,000 of which is for a "license" to use

incandescent lights, which it had already been using for several years, selling the entire increase in capital at from 90 to par. It has a contract for municipal lighting at $144 per arc per year, but has no definite franchise for private lighting. In 1890 a new company of eminent and respectable citizens is organized, at the head of which is the "boss" of one of the political party organizations. This gentleman has associated with him nine prominent citizens who control the avenues of public opinion, all the newspapers, directly or indirectly, and both political parties. They come before the Common Council promising cheaper light. They get a franchise from the aldermen by well-known methods. They invest only enough money to erect two or three poles, and so hold their franchise. They then make overtures to the old company, which again is "reorganized." This time the capitalization is increased to $1,640,000 in stock and bonds, of which $400,000 in stock is given to these ten respectable citizens who procured the franchise, and of which $750,000 is in bonds at 6 per cent interest, making a fixed charge of $45,000 in interest yearly on a plant that could be duplicated for less than $1,000,000. Here is a case where ten of the most respectable businessmen and lawyers of the city have placed their pecuniary interest in direct antagonism to good and honest government. They have become the powerful opponents of all public-spirited officials who attempt to get fair terms for the city in this particular business of controlling the supply of electric light and power; and no matter how they may afterwards "reform," and demand honest government, the people at large have learned to discount what they say, and to distrust their efforts in subsequent movements for civic reform. Strangely enough, two or three of these very same men, being appointed without salary to positions on the Board of Water Commissioners, to construct and operate

a water-works plant owned by the city, exhibited the very highest integrity and patient industry in promoting the city's interests, and in constructing a plant of which the citizens are justly proud.

We may call upon our eminent business-men to arouse from their lethargy, and to take an active part in municipal reform; but so many of them have been mixed in these "jobs" that the people at large have no confidence in their leadership, nor in any candidate for office whom they are known to advocate. Such business-men need reforming themselves; but this is to be done, not by appealing to them after the method of the revivalist, but by removing temptation from their way, and giving them an opportunity really to serve the community in a public and honorable way through the employment of their distinguished business abilities. Private ownership of municipal monopolies forces them and all whom they can influence to oppose the good of the city. Municipal ownership makes it to their interest to place their abilities at the service of the city, and to take an honest pride in the good they can contribute to it.

I do not for a moment deceive myself by thinking that this movement for municipal ownership is child's play, or that the companies now in possession will relinquish their hold without resorting to the most determined and unscrupulous devices. There are many indications that they are organiz-

ing throughout the country for an attack both upon municipal ownership and upon the integrity of municipal officials. These concerted attacks upon municipal integrity need not be looked upon as discouraging. More than anything else they will arouse the common people from their lethargy, and will disabuse them of their fond reliance on mere respectability as a guaranty of public spirit, will direct their attention to the true source of municipal corruption, and will discipline them in organized resistance and in aggressive movements upon the citadel of the corruption funds. In the end this discipline and organization will be the guaranty of efficient administration when once ownership is obtained. It is mainly in those cities like Detroit, which have had a hard training for several years in open battle with the franchise holders, that we may look for that alert public spirit and jealous determination which will make municipal ownership a lasting success.

It is this struggle with monopolists, too, which will force the people to the adoption of administrative machinery better adapted to municipal operation of industry than any that we now have. It must be confessed that the legal organization of our municipalities is not yet perfected for the espousal of public ownership on any large scale. The experience of English and many American cities indicates the following administrative re-

forms as necessary to accompany or precede municipal ownership.

1. State supervision for cities, similar to that of the Local Government Board of England, or that of the Board of Gas and Electric Light Commissioners of Massachusetts, or of the Public Examiners of Minnesota and Dakota. A State municipal board, like that proposed in New York by the Commission on Cities of the Third Class, would prescribe a most important requisite, uniform methods of municipal book-keeping; would audit accounts of cities, and would direct the proper entries for new construction, depreciation, etc. Such a board would sanction loans, and set the terms of years for repayment, and the provisions of a sinking-fund. In this way the constitutional limitation on municipal indebtedness could be replaced by a more elastic limit, on the principle that the acquisition of a productive property is really a lessening of the city's net debt, instead of an increase. The board would publish annual reports, giving details concerning finances, costs of production, revenues, etc., of the various cities, thus furnishing the basis for intelligent improvement in administration, and for further acquisition of municipal plants.[1]

[1] See article, "State Supervision for Cities," by J. R. Commons, in *Annals of American Academy of Political and Social Science*, March, 1895. Also Goodnow, "Municipal Home Rule," N.Y.,

2. The substitution of unsalaried municipal boards or commissions, instead of the Board of Aldermen, as the administrative head. These boards should be composed of five or six members, elected by the people, or appointed by the mayor, one member to be chosen each year for a term of five or six years, thus giving continuity of service. The legislative branch of our cities has so hopelessly decayed, that, until something like proportional representation is adopted, no additional powers should be granted to it. The successful electrical plants throughout the country in larger cities are under control of commissions. Wherever the spoils system and corruption exist, we may expect to find the aldermen in control. Those who argue against municipal ownership, and who appeal to their "practical" experience rather than the opinion of "theorists," do not seem to have noticed this important difference in methods of administration. Because the aldermen are corrupt and inefficient, they assume that the entire government and the people themselves are so, whereas the difficulty lies only in defective and antiquated machinery of administration. Let the aldermen be displaced by a properly constituted commission, as above indicated, and the electric administration

1895, and "Municipal Problems," N.Y., 1897, and Maltbie, "English Local Government of To-day," N.Y., 1897, Columbia University Publications.

becomes equal to the best of the ideal British municipalities.

3. The referendum and initiative. The referendum is already universal upon all questions of purchase or installation of a municipal plant. It should also be required, along with the initiative, upon questions of the sale or lease of a plant, and the appropriations for improvements. Had it been in force in Philadelphia, it is needless to say, the recent scandalous lease of the gas-plant could not have been consummated. Councils of that city refused to submit the question to the people, although earnestly petitioned to do so by the Municipal League. The obligatory referendum is also necessary, as the only thorough means for banishing bribery and the corrupt use of money from municipal politics.

4. A civil service reform system, in which the superintendent or electrical engineer at the head of the plant should be appointed on merit and held personally responsible, and then should be entirely free to appoint and remove all subordinates without interference from an outside civil service commission. This is the practice generally where a board of commissioners, instead of the aldermen or mayor, has charge of the plant.

III.

THE LATEST ELECTRIC LIGHT REPORTS.

THE LATEST ELECTRIC LIGHT REPORTS

By EDWARD W. BEMIS, Ph.D.

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It is the aim of the present chapter to embody such results of personal investigation of the reports of public and private electric-light plants as the writer has been able to gather from an extensive correspondence and some travel.

No complete report of a municipal plant will be omitted, whether a good or bad example of city ownership, but it has been necessary to discard many inadequate reports. After all, what is wanted is not so much exhaustive information of all plants, as a somewhat detailed study of typical successes and failures. In a field where one city has been successful, another should be ashamed to fail. For many a city to defer action on the problem of electric lighting until exhaustive statistics of every plant can be obtained, or even to wait the two years likely to intervene before the reports of the United States Department of Labor are avail-

able, is out of the question. Old franchises are expiring; the granting of new ones, or direct city ownership and operation, requires immediate action in scores of municipalities.

Commenting on a plea for delay made by Mr. Allen R. Foote, a former secretary of the National Electric Light Association, Mayor John MacVicar thus writes, in the *Progressive Age* of Feb. 15, 1898: —

"Had Springfield, Ill., heeded your plea seven years ago, and suspended action, that city would still be paying $137 per 2,000 candle-power lamp for street-lighting, instead of the sum it now pays, practically $60 per lamp.

"Had Rockford, Ill., waited for these statistics to guide it, it would still be paying $125 per lamp, instead of $52 per lamp. This latter city will serve as an example to illustrate that a loyal City Council, aided by a competent engineer, will serve in lieu of statistics to determine the cost of street-lighting.

"About two years ago Rockford employed an engineer to make estimates, plans, and specifications for a municipal lighting-plant. The city had been paying its local company in the neighborhood of $125 per annum for each 2,000 candle-power arc lamp burning all night and every night. Bids were received, and a contract about to be entered into, for the erection of a municipal plant, when the local company, after having exhausted every means at hand to defeat the project, appeared before the City Council and asked that the city abandon its intention of building a municipal plant, and award to it a contract for lighting at the rates estimated by the city's engineer, to be the cost of producing lights under municipal ownership, namely, $56

per lamp. The city, preferring to own its own pole line, contracted with the old company for $52 per 2,000 candle-power lamp, burning all night and every night. The contract is for a term of five years, with the privilege of an additional five years if the city so desires.

"Or had the city of Des Moines four years ago heeded your plea, or accepted statistics proffered by its water company, it would not have reduced its public and private rates 33⅓ to 40 per cent by municipal control; nor would the Supreme Court of Iowa have pronounced these rates reasonable, had it been guided by the showing of the water company's expense of operation, including interest on excessive capitalization, exorbitant salaries to officials, etc.

"Neither would the city of Des Moines, had it 'suspended judgment and action,' now be under contract for the erection of a municipal lighting-plant, to cost $105,000, which contractors guarantee to operate for $65 per arc lamp, burning all night and every night. Nor would it, in self-defense, after being temporarily enjoined by the attorneys of the private lighting-company from erecting its plant, have ventured to reduce the rates by municipal regulation from $126 and $96 to $75 and $65 per lamp. The city's information which led it to believe that these would be reasonable rates was not gathered from statistics, but from estimates of qualified engineers. No doubt the General Electric Company would contest the right of our city to name this as reasonable compensation could it induce the courts to recognize statistics such as you suggest as 'the only proper basis for comparisons.'

"Statistics received from the General Electric Company proved (?) that such a plant could not be built for less than $250,000, 'and might cost $350,000,' and could not be operated for less than we were then paying, namely, $126 per lamp. Instead of accepting these statistics 'as the only

proper basis for comparisons,' we relied upon our engineer's estimates of expense of erection and operation of the plant; and they corresponded almost exactly with the terms of the contract we succeeded in securing, convincing us that such estimates are more reliable and a better guide than statistics.

"It is true that the company threatens to bring suit to resist these regulations, but the fact that it is accepting the rates of this regulating ordinance in full of all claims gives us the right to presume that it does not wish to open its books to the public and testify to the cost of producing light. It possibly prefers to await the statistics of the United States Commissioner of Labor, hoping to use them as a true basis of comparisons."

It is indeed difficult to gather statistics of any value upon electric and gas lighting. The bias of the investigator, the secretiveness of the private companies, the poor book-keeping of many of the public companies, and the fact that the conduct of a public plant, especially one united with a water plant, does not require the keeping of accounts in the way most conducive to comparisons with other companies, account for the well-grounded distrust of most lighting statistics. Professor Commons, however, in a previous chapter, has succeeded so admirably that there is encouragement to make further efforts to gather statistical and other data.

GROWTH OF MUNICIPAL LIGHTING.

In a pamphlet published in 1890 by M. J. Francisco, at that time president of the Rutland Elec-

trical Company of Rutland, Vt., he states, "I have secured reports from fifty municipal plants, embracing nearly all of the cities in the United States owning plants, and found that the cost of these has been $1,511,225; that they are using 3,725 lamps;" — i.e., arc lamps, as the context shows.

An exhaustive examination made in the latter part of 1892 by a student of the University of Wisconsin revealed 192 public plants.

The American Electrical Directory for the first quarter of 1898 (published by E. L. Powers, Monadnock Building, Chicago, Ill., and Havemeyer Building, New York City) gives brief information about 2,261 private plants, with $229,938,605 of capital stock, 264,428 arc lights, 7,234,134 incandescent lights, and an engine horse-power, whether steam, or water, or gas, of 970,481. The Directory also gives figures for public plants. Correcting slightly the figures of the Directory relative to public plants, where correspondence with about 150 such plants has revealed errors, but accepting the figures of the Directory in over half the plants mentioned, we reach a summary of 353 public plants, having 25,343 arc lights, 354,031 incandescent lights, and 59,500 horse-power of engines. One question in a letter sent to many public plants was, "What other public lighting-plants are there within a hundred miles of you?" In

replies, the names of over fifty plants were given which are not quoted in this chapter, because it was found that a few cities had interpreted the question to mean simply plants, whether public or private, that did street-lighting. It was thought best, therefore, to exclude all replies on this head, lest some mistakes might creep in; but there is no doubt that many cities thus mentioned do own plants, thus raising somewhat the above number.

We then find that the public plants were 13.5 per cent of the total number, and had 8.7 per cent of the total arc lights, 4.7 per cent of the total incandescent lights, and 5.8 per cent of the total horse-power.

The Directory gives the present estimated population of each city having public plants; but since these are largely estimates, the accompanying table gives the population as it was in the census of 1890. In the cities having 353 public plants, there was a population at that time of 2,947,420, or 4.8 per cent of the total population of the country, including Alaska, in 1890, but of course a much larger percentage of the population living in cities and villages of over 1,000 population. Table No. 1 gives the location, the population in 1890, the number of arcs and incandescents, and the horse-power of the engines or water-power of these 353 plants, as reported to the writer or to the above Directory.

TABLE I. List of Municipal Plants.

	Population.	*No. Arc Lights.*	*No. Incandescent Lights.*	*Horse-Power of Engines.*
ALABAMA —				
Troy,	3,449	50	600	100
ARKANSAS —				
Hope,	1,937	. .	300	35
Little Rock,	25,874	212	. .	300
	27,811	212	300	335
CALIFORNIA —				
Alameda,	11,165	103	2,216	350
Santa Clara,	2,891	43	. .	60
Colton,	1,315	12	800	. .
Santa Cruz,	5,596	84	. .	72
	20,967	242	3,016	482
COLORADO —				
Del Norte,	736	15	300	80
CONNECTICUT —				
South Norwalk,	4,875	121	2,000	280
DELAWARE —				
Middletown,	1,454	2	1,200	100
Milford,	1,226	4	1,600	100
Newark,	214	. .	1,200	100
Smyrna,	2,445	5	900	140
	5,339	11	4,900	440
FLORIDA —				
Fernandino,	2,803	20	. .	50
Jacksonville,	17,201	238	8,245	630
	20,004	258	8,245	680
GEORGIA —				
Cedartown,	1,625	35	700	100
Dawson,	2,284	55	850	125
Elberton,	1,572	61	1,200	100
Gainesville,	3,202	50	. .	80
Griffin,	4,503	52	1,750	150
Madison,	2,131	50	600	. .
Quitman,	1,868	24	630	75
West Point,	1,254	37	885	110
	18,439	364	6,615	740
ILLINOIS —				
Aurora,	19,688	206	. .	200
Benton,	908	14	700	75

ILLINOIS (*continued*) —	*Population.*	*No. Arc Lights.*	*No. Incandescent Lights.*	*Horse-Power of Engines.*
Bloomington,	20,484	307	. .	350
Blue Island,	3,329	72	2,200	300
City of Chicago,	1,099,850	1,321	. .	1,500
Lincoln Park, Chicago,	1,099,850	243	1,030	420
South Park, "	1,099,850	490	. .	480
West Chicago Park Commission, Chicago,	1,099,850	900	1,200	1,300
Coal City,	1,672	32	800	100
Decatur,	16,841	156	. .	150
El Dorado,	1,500	17	244	80
Elgin,	17,823	156	. .	125
Farmer City,	1,367	. .	1,400	80
Geneva,	1,692	55	600	170
Harlem,	. .	80	40	100
Harvard,	1,967	27	. .	50
Jacksonville,	12,935	145	. .	115
La Salle,	9,855	98	. .	125
McLeansboro,	1,355	39	700	125
Marengo,	1,445	26	750	100
Mattoon,	6,833	105	. .	125
Metropolis,	3,573	37	700	100
Milstadt,	1,186	36	300	80
Mt. Olive,	1,986	40	750	125
Morgan Park,	1,027	50	. .	50
Newton,	1,428	100	. .	. .
Paris,	4,996	83	. .	150
Peru,	5,550	. .	3,500	175
Pittsfield,	2,295	30	2,000	300
Rochelle,	1,789	60	1,500	150
Rock Falls,	1,900	30	1,200	100
St. Charles,	1,690	. .	600	200
Sandwich,	2,516	64	1,800	110
Staunton.	2,209	34	550	100
Venice,	932	85	. .	100
	1,251,112	5,138	22,564	7,810
INDIANA —				
Anderson,	10,741	. .	. .	. .
Bluffton,	3,589	75	. .	100
Columbus,	6,719	82	. .	80

	Population.	*No. Arc Lights.*	*No. Incandescent Lights.*	*Horse-Power of Engines.*
INDIANA (*continued*) —				
Crawfordsville,	6,089	145	2,650	750
Goodland,	15,000	23	1,100	100
Goshen,	6,033	165	. .	350
Huntington,	7,328	60	. .	75
Kendallville,	2,960	60	. .	125
Logansport,	13,328	202	10,000	1,115
Marion,	8,769	118	. .	300
Martinsville,	2,680	. .	. .	. .
Muncie,	11,345	147	. .	175
Nappanee,	1,493	27	800	100
New Castle,	2,697	61	1,000	150
Oxford,	808	20	500	75
Portland,	3,725	52	. .	rent.
Rushville,	3,475	52	1,500	200
Vevay,	1,663	28	600	90
	94,331	1,317	18,150	3,910
IOWA —				
Afton,	1,045	. .	325	35
Alta,	768	. .	600	70
Ames,	1,276	17	1,231	150
Bellevue,	1,394	13	. .	100
Bloomfield,	1,913	. .	2,200	175
Chariton,	3,122	. .	1,700	200
Clarion,	744	. .	700	60
Estherville,	1,475	15	1,200	100
Fairfield,	3,391	19	. .	25
Greenfield,	1,048	. .	700	60
Harlen,	1,765	. .	1,200	100
Hawarden,	744	. .	1,800	80
Independence,	3,163	6	5,000	300
Indianola,	2,254	. .	1,200	125
Keokuk,	14,101	. .	. .	. .
Leon,	1,422	. .	650	200
Lisbon,	1,079	19	700	75
Lyons,	5,799	57	. .	120
Marshalltown,	8,914	98	. .	80
Newton,	2,564	4	3,500	250
Stuart,	2,052	. .	1,750	100
Vinton,	2,865	9	1,200	150

	Population.	No. Arc Lights.	No. Incandescent Lights.	Horse-Power of Engines.
IOWA (*continued*) —				
Wilton Junction,	1,212	500	. .	65
Winterset,	2,281	40	1,600	100
	66,391	797	27,256	2,720
KANSAS —				
Council Grove,	2,211	12	63	. .
Garnett,	2,238	. .	480	. .
Hiawatha,	2,486	30	. .	40
Topeka,	31,007	264	. .	225
	37,942	306	543	265
KENTUCKY —				
Bardstown,	1,524	25	. .	. .
Bowling Green,	7,803	80	. .	100
Henderson,	8,835	163	. .	. .
Hickman,	1,652	20	500	80
Paducah,	12,797	120	. .	175
	32,611	408	500	355
LOUISIANA —				
Alexandria,	2,861	8	2,000	200
MAINE —				
Bangor,	19,103	156	. .	. .
Lewiston,	21,701	130	. .	225
Kennebunk,	3,172	. .	. .	. .
	43,976	286	. .	225
MARYLAND —				
Frederick,	8,193		76	85
MASSACHUSETTS —				
Braintree,	5,311	92	4,364	225
Danvers,	8,181	88	1,675	220
Chicopee,	16,420	132	2,548	350
Hingham,	4,819	0	3,594	. .
Hudson,	5,308	17	284	60
Hull,	1,044	2	3,943	495
Marblehead,	7,671	164	2,972	400
Middleborough,	6,689	119	1,899	150
Needham,	3,511	. .	310	. .
North Attleborough,	6,576	3	3,075	350
Peabody,	10,507	161	3,508	400
Reading,	4,717	125	2,594	300
Taunton,	27,115	224	4,673	665

MASSACHUSETTS (*continued*)—	*Population.*	*No. Arc Lights.*	*No. Incandescent Lights.*	*Horse-Power of Engines.*
Wakefield,	3,304	144	2,300	250
Wellesley Hills,	4,229	. .	504	. .
	115,402	1,271	38,243	3,865
MICHIGAN—				
Bay City,	27,839	220	. .	425
Chesaning,	1,056	23	700	. .
Crystal Falls,	1,500	. .	900	. .
Clinton,	960	37	540	. .
Cold Water,	2,247	101	3,600	240
Detroit,	205,876	1,820	3,901	1,700
Dowagiac,	2,806	40	124	. .
Durand,	255	22	1,600	100
East Tawas,	2,226	26	400	. .
Escanaba,	6,808	60	1,000	250
Evart,	1,269	16	900	80
Fremont,	1,097	30	1,350	. .
Flushing,	965	abt. 20	abt. 1,000	. .
Grand Ledge,	1,606	26	1,200	100
Grand Haven,	5,023	75	1,300	150
Hart,	12,000	20	450	100
Hillsdale,	3,915	58	1,713	200
Holland,	3,945	59	3,620	275
Kalamazoo,	17,853	200	. .	300
Lansing,	13,102	250	4,600	400
Lowell,	1,829	52	1,035	200
Marlette,	1,050	3	400	150
Marquette,	9,093	101	2,200	300
Marshall,	3,968	116	1,500	330
Mason,	1,875	42	450	100
Niles,	4,197	98	2,008	500
Ontonagon,	1,250	8	885	. .
Ovid,	1,423	25	1,000	100
Oxford,	1,128	35	1,600	125
Paw Paw,	1,391	56	1,400	128
Portland,	1,678	34	1,200	175
St. Clair,	2,353	12	400	150
St. Ignace,	2,704	51	. .	. .
St. Johns,	3,127	50	1,500	200
Shelby,	994	14	450	65
South Haven,	1,924	25	1,200	150

	Population.	No. Arc Lights.	No. Incandescent Lights.	Horse-Power of Engines.
MICHIGAN (*continued*) —				
Staunton,	1,352	19	778	75
Thompsonville,	. .	7	200	. .
Three Oaks	885	12	232	50
Union City,	1,156	. .	1,200	60
Vicksburg,	921	23	250	. .
Ypsilanti,	6,129	88	. .	. .
	351,532	3,964	48,786	7,178
MINNESOTA —				
Adrian,	671	16	600	80
Atkin,	737	15	800	80
Alexandria,	2,118	11	1,000	90
Arlington,	417	4	200	{ power rented.
Blue Earth City,	1,569	27	1,000	100
Brainerd,	5,703	34	2,500	350
Delano,	889	. .	. .	. .
Ely,	901	37	700	125
Fulda,	348	. .	600	. .
Granite Falls,	800	21	800	70
Henderson,	909	13	500	60
Lake City,	2,128	62	1,200	125
Litchfield,	1,899	32	950	90
Long Prairie,	680	. .	. .	. .
Luverne,	1,466	32	2,700	250
Marshall,	1,203	55	1,700	100
Moorhead,	2,008	. .	. .	. .
Preston,	910	6	1,200	100
Rochester,	5,321	127	1,600	250
St. James,	939	6	3,000	100
St. Peter,	3,671	45	700	125
Sleepy Eye,	1,513	65	. .	74
Springfield,	716	42	54	100
Tracy,	1,400	35	1,000	120
Waseca,	2,482	80	1,000	175
Wilmar,	1,825	13	1,040	140
	43,303	778	24,834	2,704
MISSISSIPPI —				
Aberdeen,	3,449			
Canton,	2,131	35	1,800	330
	5,580	35	1,800	330

	Population.	*No. Arc Lights.*	*No. Incandescent Lights.*	*Horse-Power of Engines.*
MISSOURI —				
Albany,	1,334	30	2,100	120
Bethany,	1,105	23	1,000	150
Brunswick,	1,748	20	450	60
Cameron,	2,917	30	1,200	150
Fayette,	2,247	50	600	100
Fulton,	4,314	15	2,000	160
Hannibal,	12,857	87	4,448	300
Harrisonville,	1,645	38	750	. .
Higginsville,	2,342	40	700	100
Holden,	2,520	35	500	100
Macon,	3,371	50	1,200	150
Pierce City,	2,511	58	650	90
Princeton,	1,410	. .	. .	. .
Rockport,	934	. .	700	125
St. Charles,	6,161	82	. .	200
St. Joseph,	52,324	355	. .	450
Salisbury,	1,672	40	720	150
Savannah,	1,288	30	1,200	100
Shelbina,	1,691	. .	700	50
Slater,	2,400	50	500	80
	106,791	1,033	19,418	2,635
MONTANA —				
Miles City,	956	64	1,550	175
NEBRASKA —				
Crete,	2,310	50	. .	45
Falls City,	2,102	. .	900	60
Fremont,	6,747	72	. .	. .
Lexington,	1,392	. .	500	50
Pawnee City,	1,550	26	1,000	100
Schuyler,	2,160	18	700	120
Tecumseh,	1,654	. .	520	50
	17,915	166	3,620	425
NEW HAMPSHIRE —				
Wolfboro,	3,020		1,039	65
NEW JERSEY —				
Atlantic Highlands,	945	68	1,000	150
Madison,	2,469	. .	3,914	330
Ocean Grove,	2,754	120	3,080	900
	6,168	188	7,994	1,380

	Population.	No. Arc Lights.	No. Incandescent Lights.	Horse-Power of Engines.
NEW YORK —				
Batavia,	7,221	103	300	125
Dunkirk,	9,416	75	. .	100
Fredonia,	3,399	50	. .	70
Green Island,	4,463	55	1,200	335
Hamilton,	1,744	50	2,500	300
Herkimer,	3,150	100	. .	100
Jamestown,	16,038	283	1,600	750
Mayville,	1,164	28	700	100
Springville,	1,883	36	850	225
Tully,	498	17	500	80
Watervleit,[1]	15,000	115	. .	125
Westfield,	1,983	78	700	210
West Troy,	12,967	113	200	125
	78,926	1,103	8,550	2,645
NORTH CAROLINA —				
High Point,	5,000	38	300	72
Kinston,	1,726	35	507	80
Reidsville,	2,969	36	250	65
Statesville,	2,318	30	300	70
Wilson,	2,126	42	2,000	125
	11,318	181	3,357	412
OHIO —				
Ashtabula,	8,338	94	4,500	650
Bryan,	3,068	85	1,800	250
Carthage,	2,257	45	. .	80
Clyde,	2,327	51	750	125
Columbiana,	1,112	40	750	100
Conneaut,	3,241	50	1,000	160
Cuyahoga Falls,	2,614	56	850	100
DeGraff,	1,076	30	1,300	125
Galion,	6,326	128	1,000	300
Granville,	1,366	40	. .	60
Greenfield,	2,460	67	1,950	265
Greenwich,	881	25	400	125
Hamilton,	17,565	209	3,828	910
Hubbard,	1,498	20	. .	. .
Jackson,	4,320	52	1,200	200
Linwood,	1,291	. .	. .	. .

[1] Present population estimated by American Electrical Directory.

OHIO (*continued*) —	*Population.*	*No. Arc Lights.*	*No. Incandescent Lights.*	*Horse-Power of Engines.*
London,	3,313	73	1,200	160
Loudonville,	1,444	42	750	150
Lynchburg,	763	32	500	65
Madisonville,	2,214	80	1,500	150
Marietta,	8,273	112	300	150
Martins Ferry,	8,273	100	1,000	300
Miamisburg,	2,952	50	1,400	200
Minerva,	1,139	50	. .	. .
Montpelier,	2,200	42	1,200	125
Mt. Sterling,	752	27	900	75
Newark,	14,270	250	. .	226
Niles,	4,289	115	. .	80
Norwood,	845	162	1,150	200
Oxford,	1,922	43	2,700	135
Painesville,	4,755	90	. .	150
Plain City,	1,245	32	750	150
Portsmouth,	12,394	. .	. .	. .
St. Bernard,	1,779	80	575	200
St. Clairesville,	1,191	30	500	150
Shelby,	1,977	67	1,527	305
Troy,	4,494	108	1,500	300
Wapakoneta,	3,616	79	1,000	180
Wellston,	4,377	. .	. .	. .
Willoughby,	1,219	29	900	75
Wilmington,	3,079	115	1,200	200
Woodville,	622	21	600	. .
	153,137	2,821	40,480	7,176
OREGON —				
McMinnville,	1,368	. .	600	80
Scio,	616	. .	175	25
	1,984	. .	775	105
PENNSYLVANIA —				
Allegheny,	105,287	1,146	5,373	1,850
Chambersburg,	7,836	167	1,650	450
Easton,	14,481	146	. .	400
Meadville,	9,520	72	. .	. .
Middletown,	5,080	60	120	300
North East,	1,538	30	. .	50

	Population.	No. Arc Lights.	No. Incandescent Lights.	Horse-Power of Engines.
PENNSYLVANIA (*continued*)—				
Quakertown,	2,169	42	3,000	240
St. Clair,	3,680	33	1,982	340
Schuylkill Haven,	3,088	42	600	100
Sharpsburg,	4,898	47	1,300	180
Shickshinny,	1,448	22	400	80
Tarentum,	4,627	70	1,400	125
Titusville,	8,073	100	. .	68
Weatherly,	2,961	. .	. .	. .
West Newton,	2,285	32	1,000	. .
	176,971	2,009	16,825	4,183
SOUTH DAKOTA—				
Madison,	1,736	7	800	80
TENNESSEE—				
Dayton,	2,719	. .	475	100
Harriman,	716	55	. .	75
Lebanon,	1,883	18	300	. .
McMinnville,	1,677	45	825	. .
Morristown	1,999	30	390	50
Paris,	1,917	28	1,000	125
Union City,	3,441	. .	450	80
	14,352	176	3,440	430
TEXAS—				
Ft. Worth,	23,076	68	402	160
Galveston,	29,084	300	600	400
Greenville,	4,330	35	1,750	225
Halletsville,	1,011	. .	700	85
Honey Grove,	1,828	40	910	100
Sherman,	7,395	54	. .	300
	66,724	497	4,362	1,270
UTAH—				
Logan,	4,565	13	50	. .
Payson,	2,135	. .	500	120
	6,700	13	550	120
VERMONT—				
Barton,	2,217	. .	2,000	500
Highgate,	1,853	. .	1.200	. .
Johnson,	1,462	. .	1,000	150
Lyndonville,	606	34	4,000	800
Morrisville,	1,300	21	2,000	. .

	Population.	*No. Arc Lights.*	*No. Incandescent Lights.*	*Horse-Power of Engines.*
VERMONT (*continued*) —				
Northfield,	2,000	. .	1,500	400
Swanton,	2,628	25	3,500	500
Wells River,	526	. .	800	150
	11,814	80	16,000	2,500
VIRGINIA —				
Alexandria,	14,339	97	. .	80
Danville,	10,305	140	. .	30
Farmville,	2,404	24	263	100
Franklin,	875	. .	300	30
Salem,	3,279	50	600	100
South Boston,	1,789	11	. .	35
Staunton,	6,975	100	. .	100
	39,966	422	1,163	475
WASHINGTON —				
Chehalis,	1,309	30	700	120
Ellensburg,	2,769	41	850	250
Port Angeles,	316	. .	400	65
Sprague,	1,689	26	500	75
Tacoma,	36,006	485	7,000	1,000
Waterville,	293	. .	350	45
	42,382	582	9,800	1,555
WEST VIRGINIA —				
Wheeling,	34,522	468	. .	500
WISCONSIN —				
Bayfield,	1,373	. .	650	125
Mazomanie,	1,034	. .	300	60
Reedsburg,	1,738	30	2,500	160
	4,145	30	3,450	345

Of the 350 cities, Chicago had 1,099,850 population in 1890, and now has four public arc plants, — one owned by the city of Chicago, with three large central stations; one by the West Park Board; another by the Lincoln Park Board; and the best managed of all, that of the South Park Board. Detroit had 205,876 population in 1890; Allegheny

had 105,287; St. Joseph, Mo., 52,324. There were 52 other cities having a population of over 8,000, the largest, Tacoma, Wash., having 36,006. Of the remaining 294 cities of less than 8,000 population, 151 had under 2,000, and 46 had under 1,000.

To specify in more detail, 4 cities had over 50,000 population; 52 had between 8,000 and 36,000; 28 had between 5,000 and 8,000; 50 had between 3,000 and 5,000; 62 had between 2,000 and 3,000; 108 had between 1,000 and 2,000; and 46 had less than 1,000 population.

Over one-half of these cities did not have plants in 1890; and nearly all have a larger population now, and many places are much larger.

The location of these plants is very interesting. New England has 28, of which Massachusetts has 15 and Vermont 8 plants. There are only 80 plants west of Iowa and south of Ohio and Pennsylvania. Of these, 42 are in six States: Virginia, Tennessee, Nebraska, and Washington have 7 plants each, Georgia 8, and Texas 6. The remaining 244 are between the Hudson and Missouri Rivers. Michigan and Ohio lead, with 42 plants each; then follow Illinois with 36, Minnesota with 26, Iowa with 24, Missouri with 20, Indiana with 19, and Pennsylvania with 17. These eight States have 226 plants.

It is very interesting to notice that the States where there have appeared the most radical popu-

listic platforms in favor of government ownership of public utilities, such as the States of the far West and South, have little to show as yet of municipal ownership of lighting-plants in comparison with the rest of the country; and the same is true with respect to water-works. Of course the absence of large cities, and the predominantly agricultural character of most of the South and West, leading to a greater interest in questions of money and transportation than of city monopoly, account for this in large part.

There are no public plants, apparently, in Rhode Island, South Carolina, North Dakota, Idaho, Wyoming, Arizona, and New Mexico, and only one each in New Hampshire, Connecticut, Maryland, West Virginia, Alabama, Louisiana, Colorado, South Dakota, and Montana, and two each in Florida, Mississippi, Arkansas, Utah, and Oregon. There are three each in Maine, New Jersey, and Wisconsin.

In point of population in cities having public ownership, Illinois leads, with 1,253,332 in 1890; Michigan is second, with 346,500 population in such cities; Pennsylvania third, with 177,854; Ohio fourth, with 153,137; and Massachusetts fifth, with 115,402.

In respect to the number of arc lights, Illinois leads again, with 5,158 lights provided by her public plants; Michigan second, with 3,964; Ohio

third, with 2,821; Pennsylvania fourth, with 2,025; and Indiana fifth, with 1,403 arc lights. In the matter of incandescents, Michigan leads, with 48,786 such lights; Ohio is second, with 40,480; Massachusetts third, with 38,243; Iowa fourth, with 27,256; and Minnesota fifth, with 24,844. In the matter of horse-power, of either engine or water-power, Illinois leads again, with 7,810 horse-power; Ohio is a close second, with 7,376; Michigan third, with 7,178; Pennsylvania fourth, with 4,223; and Indiana fifth, with 3,910.

These facts are presented in the accompanying Table No. II.

TABLE II. Summaries by States.

States.	*No. Plants.*	*Populations.*	*No. Arcs.*	*No. Incandescents.*	*Horse-Power.*
Alabama,	1	3,449	50	600	100
Arkansas,	2	27,811	212	300	335
California,	4	20,967	242	3,016	482
Colorado,	1	736	15	300	80
Connecticut,	1	4,875	121	2,000	280
Delaware,	4	5,339	11	4,900	440
Florida,	2	20,004	258	8,245	680
Georgia,	8	18,439	364	6,615	740
Illinois,	36	1,253,332	5,158	22,564	7,810
Indiana,	19	103,267	1,403	18,150	3,910
Iowa,	24	66,391	797	27,256	2,720
Kansas,	4	37,942	106	543	265
Kentucky,	5	32,611	408	500	355
Louisiana,	1	2,861	8	2,000	200
Maine,	3	43,976	286	. .	225
Maryland,	1	8,193	. .	76	85
Massachusetts,	15	115,402	1,271	38,243	3,865
Michigan,	42	351,532	3,964	48,786	7,178
Minnesota,	26	43,303	778	24,844	2,704

States.	*No. Plants.*	*Populations.*	*No. Arcs.*	*No. Incandescents.*	*Horse-Power.*
Mississippi,	2	5,580	35	1,800	330
Missouri,	20	106,791	1,033	19,418	2,635
Montana,	1	1,956	64	1,550	175
Nebraska,	7	17,915	166	3,620	425
New Hampshire,	1	3,020	. .	1,039	65
New Jersey,	3	6,168	188	7,994	1,380
New York,	13	78,926	1,103	8,550	2,645
North Carolina,	5	11,318	181	3,357	412
Ohio,	42	153,137	2,821	40,480	7,376
Oregon,	2	1,984	. .	775	105
Pennsylvania,	17	177,854	2,025	16,915	4,223
South Dakota,	1	1,736	7	800	80
Tennessee,	7	14,352	176	3,440	430
Texas,	6	66,724	497	4,362	1,270
Utah,	2	6,700	13	550	120
Vermont,	8	11,814	80	16,000	2,500
Virginia,	7	39,966	422	1,163	475
Washington,	6	42,382	582	9,800	1,555
West Virginia,	1	34,522	468	. .	500
Wisconsin,	3	4,145	30	3,450	345
No. of States, 39.	353	2,947,420	25,343	354,031	59,500

AGE OF MUNICIPAL PLANTS.

From letters to the writer, and from Professor Parsons's tables in the *Arena* for September, 1895, it is possible to give in Table III. the date of beginning of city ownership in 144 electric-light plants.

Most of the approximately 200 remaining plants given in another table have begun city ownership since 1892. Some errors may have crept into the table here given, but it is substantially correct.

It will be noticed that the oldest plant is Fairfield, Ia., built in 1882, and devoted exclusively to

street-lighting, with only 19 arcs. Next come Meadville, Pa., and Santa Cruz, Cal., in 1883; and there is at least one Canadian plant of the same year, that of Orella, Ont. Meadville does no commercial lighting, having 72 street arcs; and Santa Cruz confines itself to 84 street arcs.

In 1885 public plants were built in Danville, Va., which does commercial as well as public lighting, and in Huntington, Ind., which now has 60 street arcs.

The fact that more cities in this table, viz., 25, are reported as entering upon city ownership in 1892 than in any other year, really implies nothing as to the rapidity of increase of municipal ownership, since most of the nearly 200 plants omitted are probably less than six years old.

TABLE III. Age of 143 Public Plants.

1882.	Easton, Pa.
Fairfield, Ia.	Grand Ledge, Mich.
	Hannibal, Mo.
1883.	Portsmouth, O.
Meadville, Pa.	1887.
Santa Cruz, Cal.	Alameda, Cal.
1885.	Aurora, Ill.
Danville, Va.	Bay City, Mich.
Huntington, Ind.	Brainerd, Minn.
	Chicago, Ill.
1886.	Council Grove, Pa.
Crete, Neb.	Lewiston, Me.
Decatur, Ill.	Marshalltown, Ia.
	Paris, Ill.

1888.

Bowling Green, Ky.
Council Grove, Kan.
Dunkirk, N.Y.
Frederick, Md.
Gainesville, Ga.
Galion, O.
Jackson, O.
Leon, Ia.
Lewiston, Me.
Painesville, O.
Sherman, Tex.
Ypsilanti, Mich.

1889.

Bangor, Me.
Bloomington, Ill.
Chambersburg, Pa.
Chariton, Ia.
Danvers, Mass.
Galveston, Tex.
Goshen, Ind.
Litchfield, Minn.
Little Rock, Ark.
Marietta, O.
Marquette, Mich.
Oxford, O.
Sharpsburg, Pa.
Titusville, Pa.
Topeka, Kan.
West Troy, N.Y.

1890.

Alexandria, Minn.
Allegheny, Pa.
Elgin, Ill.
Emaus, Pa.
Fredonia, N.Y.
Indianola, Ia.
La Salle, Ill.
McMinnville, Or.
Middletown, Pa.
Newton, Ia.
St. Charles, Mo.
Shelby, O.
Troy, Ala.

1891.

Albany, Mo.
Cameron, Mo.
Cold Water, Mich.
Crawfordsville, Ind.
Ft. Worth, Tex.
Herkimer, N.Y.
Madison, Ga.
Madison, N.J.
Miamisburg, O.
St. Clairsville, O.
Shelbina, Mo.
South Norwalk, Conn.
Tracy, Minn.

1892.

Ashtabula, O.
Braintree, Mass.
Carthage, O.
Chehalis, Wash.
Jamestown, N.Y.
Lansing, Mich.
Loudonville, O.
Marion, Ind.
Marseilles, Ill.
Metropolis, Ill.
Peabody, Mass.
Pierce City, Mo.
Quakertown, Pa.
Rockport, Mo.
St. Charles, Ill.
St. Peter, Minn.
Salisbury, Mo.
Savannah, Mo.
Schuyler, Neb.
South Park, Chicago.
Swanton, Vt.

Wellesley, Mass.
Wellston, O.
Westfield, N.Y.
Wheeling, W. Va.

1893.

Batavia, N.Y.
Clyde, O.
Coal City, Ill.
DeGraff, O.
Fayette, Mo.
High Point, N.C.
Holland, Mich.
Kendallville, Ind.
Marshall, Mich.
Middleborough, Mass.
Needham, Mass.
Newcastle, Ind.
St. Claire, Mich.
Salem, Va.
Tacoma, Wash.

1894.

Higginsville, Mo.
Hillsdale, Mich.
Hull, Mass.
Logansport, Ind.
Newark, O.
Niles, Mich.
N. Attleborough, Mass.
Wakefield, Mass.
Waseca, Minn.

1895.

Detroit, Mich.
Fremont, Neb.
Hamilton, O.
Harrisonville, Mo.
Hingham, Mass.
Jacksonville, Fla.
Kalamazoo, Mich.
Marblehead, Mass.
Reading, Mass.
South Haven, Mich.

1896.

Ames, Io.
Atlantic Highlands, N.J.
Chicopee, Mass.
Henderson, Ky.
London, O.
Miles City, Mont.
Paducah, Ky.

1897.

Harriman, Tenn.
Hudson, Mass.
Princeton, Ill.

DEPRECIATION.

Mr. Horatio A. Foster, the fairest of the opponents of municipal ownership, is now ready to concede 5 per cent as a sufficient allowance for interest in the case of city plants, but still insists upon $7\frac{1}{2}$ per cent for depreciation. (See a letter from him in *Electric Engineering*, May 12, 1898.) He con-

cedes, however, that private plants do not make such allowance any more than do public plants. In fact, the managers of private plants rarely charge off more than 3 per cent for depreciation, and scarcely refer to it except when they criticise a public plant for not charging off 7 per cent or 10 per cent yearly.

In Massachusetts, in the year June 30, 1889–1890, the electric-light plants apparently charged off nothing for depreciation, although they reported to the Massachusetts Gas and Electric Light Commission net earnings of $469,016.05 on a capital of over $6,000,000. The following table, No. IV., gives the reported assets and the depreciation in dollars and percentages during each subsequent year: —

TABLE IV.

Year.	*Assets.*	*Depreciation.*	*Per cent. of Depreciation.*
1890–1891	$ 9,931,887.66	$ 41,225.21	.42
1891–1892	12,438,857.19	210,168.78	1.69
1892–1893	14,275,363.24	214,729.89	1.50
1893–1894	15,028,578.97	151,388.66	.99
1894–1895	15,620,073.00	565,287.65	3.62
1895–1896	15,892,336.86	446,632.89	2.80
1896–1897	17,147,749.23	290,256.18	1.62
Totals and Averages,	$100,334,846.15	$1,919,689.26	1.91

It will be observed that the average depreciation or percentage of the sum of the assets for the seven years borne by the $1,919,689.26 charged to depreciation was only 1.91 per cent. The highest

average charge, that of 1894–1895, was 3.62 per cent; and the average of the next two years was 2.23 per cent, being 2.8 per cent in 1895–1896, and 1.62 per cent in 1896–1897. During the latter year there were 83 private plants in the State.

It is almost certain that if we omit the value of the franchise or gift of the people, the depreciation of the tangible assets is more than is usually charged off by private companies. The latter, acting on the principle that "sufficient unto the day is the evil thereof," are yearly giving to their stockholders larger returns than they should be allowed to do, and thereby are preparing the way for great losses to those who may be stockholders at the time, rapidly approaching, when public purchase or regulation of rates shall be very largely based on the cost of duplication of the physical plant. The table just presented, however, shows how ill it becomes the managers of private plants to charge public plants with insufficient allowance for depreciation; but disinterested students cannot, of course, be content with such a dismissal of the problem.

The question may therefore be approached from another side. The city of Chicago plant, because of the construction of some of it before 1890, when depreciation was far greater than now, owing to the experimental character of electric lighting at that time, and probably also because of the inef-

ficient character of the city government, has experienced a heavier depreciation than any of the other plants examined by the writer as to this point, with the possible exception of one or two small plants, subject to special misfortune by fire. The entire cost of construction of the 1,321 arc lights that were in use at the beginning of 1898 is reported by the chief electrician, Mr. Edward B. Ellicott, as $797,411.11, or $603.64 per arc; but Mr. Ellicott says an equally efficient plant could be duplicated to-day for one-half that. To write off such an amount of depreciation as this implies would have required an allowance each year, from 1887 until January, 1893, of 15 per cent yearly, and of 7½ per cent subsequently on the assets, as they stood at the beginning of each year, after deducting the depreciation and adding the new construction of the previous year. Such a depreciation is computed by the writer in later tables when referring to Chicago.

Another plant, started in 1887, that of Aurora, Ill., was still more closely investigated.[1] Its tangible assets were valued by two different electric light experts as worth about $30,000, or about $150 for each of its 206 arcs. It was further found that an allowance of 10 per cent yearly of

[1] The writer was aided in the study of this plant by Mr. Henry L. Schoolcraft, a Fellow in History at the University of Chicago, who spent some time in Aurora in careful study of the plant.

depreciation, prior to 1894, and of 5 per cent since then, would reduce the amount paid for the plant at different times to this amount.

A special investigation of a third plant, likewise established in 1887, that of Topeka, Kan., was also made on the ground.[1] The dynamos of the Topeka plant were replaced in 1896 by better dynamos. The present value of the tangible assets, according to the superintendent and to a well-known electrical engineer, could be duplicated for about $45,000, or about $174 per arc. A depreciation of 5 per cent yearly upon all the cost of construction is sufficient to cover all the loss in value up to date.

We next come to a plant built since 1893, under modern conditions, — the Detroit, Mich., plant. We have here, as a guide, the estimates of the builder of the plant, who was for a time its manager, and is now the manager of a large private plant at Detroit, Mr. Alex Dow, a man of wide experience in such matters, and the ablest and most fair-minded electrician in private employ that the writer has met in this investigation. From an article in *The Western Electrician* (Chicago, Feb. 22, 1896), and in letters to the writer, Mr. Dow

[1] The work in this case was undertaken for the writer by a graduate student of the Kansas State Agricultural College, Mr. Henry M. Thomas, who had had considerable experience as an engineer. The full results of his investigation are given in an appendix to this chapter.

analyzes the probable depreciation of the Detroit plant as nothing on the land, 2 per cent on the buildings and wharf, 4 per cent on the towers and lamp-posts, 5 per cent on the steam plant, and 10 per cent on the dynamos and other electrical machinery. He has given no estimates on the remaining parts of the plant — about one-sixth of the whole. Most of the remainder consists of cables and conduits, which certainly do not depreciate any faster than the rest of the plant. On this basis the depreciation of the entire plant is only 4.57 per cent. Even 3 per cent of the rest of the plant, if yearly placed at interest, says Mr. Dow, would probably take care of all future renewals and replacements in this plant.

The superintendent of the large Allegheny, Pa., public lighting-plant, Mr. D. Hunter, Jr., whose plant is everywhere conceded to be one of the best managed public plants in America, and the engineer of the equally famous South Park plant of Chicago, inform the writer that they believe 3 per cent to 5 per cent is sufficient to allow for depreciation where the cost of renewing apparatus is charged to maintenance.

It has seemed proper, therefore, in the computations of this chapter, to allow 5 per cent depreciation for 1897; although in some plants a larger percentage has been allowed for previous years, especially prior to 1893. In order that those not

satisfied with this may have a basis for computing higher rates of depreciation, there is given in the same tables a column showing the increased cost that would come from reckoning depreciation at Mr. Foster's figures of 7½ per cent. Of course it is plain that having reckoned depreciation at say 5 per cent as part of the cost in a given year, both interest and depreciation must be reckoned the next year on only 95 per cent of the value of the plant the year before, unless allowance must be made for new construction. In other words, depreciation in a city plant should be considered equivalent to a sinking-fund, unless it is spent directly for extensions, without the issuing of additional bonds or requirement of extra taxes. The ignoring of this simple matter has led many critics of public ownership to pile up enormous figures of cost against public plants. It is quite common, for instance, to find the Chicago plant charged by critics with full allowance for depreciation each year since its construction, and still charged with full interest and depreciation to-day on all the money ever put into the plant.

COMMERCIAL RATES.

In comparing the cost of arc lights in public plants that do not do commercial lighting and in private plants that do, the former are placed at a disadvantage, because private plants, with scarcely

an exception, combine commercial with street lighting, which secures economy in the production of both. In other cases where the public plants do commercial lighting, it has been impracticable to secure the commercial rates of private companies for comparison with the commercial rates of public plants, but a large amount of evidence at hand points to a higher charge for commercial lighting by private than by public plants. Professor Commons has already discussed this question with reference to Massachusetts and other places. Professor Parsons's *Arena* articles in 1895 confirm this. The following tables, based on the chapter on municipal lighting in Michigan, in the report for 1898 of the Michigan Bureau of Labor Statistics, strikingly confirm the same position.

TABLE V. Commercial Charges in Michigan.

PRIVATE PLANTS.

Name.		*Incandescents per Month.*	*Incandescents per Kilowatt.*	*Arcs per Month.* 2,000 *c.p.*	1,200 *c.p.*
Albion,		$0.60	$0.15	$5.00	. .
Alpina,	W. P.	.75	.20	6.25	. .
Ann Arbor,		. .	.14	6.00	. .
Adrian,		. .	.14	6.25	. .
Battle Creek		.65	.15	5.00	. .
Big Rapids	W. P.	.25	.10	3.00	. .
Fairman,	W. P.	.25	. .	. .	$3.00
Bessimer,		1.00	. .	. .	5.00
Codillac,		.60	.15	. .	7.00
Charlotte,		.75	.20	8.33	. .
Claire,		.50	. .	5.00	. .
Mutual of Detroit,		1.00	.20	4.00	. .

Name.		Incandescents per Month.	Incandescents per Kilowatt.	Arcs per Month. 2,000 c. p.	1,200 c. p.
Edison,		. .	$0.16	. .	. .
Flint,		$0.75	. .	$6.50	. .
Grand Rapids,	W. P.	. .	.10	8.00	. .
Peninsula of Grand Rapids,	W. P.	.60	. .	5.00	. .
Edison of Grand Rapids,		. .	.20	8.50	. .
Greenville,	W. P.	1.00	.32	6.00	. .
Hastings,		.50	.15	. .	. .
Howell,		. .	. .	6.00	. .
Houghton,		.63	.15	8.00*	. .
Hudson,		.60	.15	. .	. .
Iron Mountain,		.60	.20	. .	$8.00
Ishpeming,		.90	.20	9.00	. .
Ironwood (Twin City),		1.00	.25	10.00	. .
Ionia,		.75	.20	9.80	. .
Jackson,		.50	.12	5.00	. .
Kalamazoo,		1.00	.20	7.50*	. .
Ludington,		.75	.15	. .	6.00
Lapeer,		.50	.15	. .	5.20
Marine City,		1.00	.15	5.00	. .
Menominee,		.50	.15	. .	6.00
Monroe,		.70	.17	. .	. .
Muskegan,		1.00	.16	. .	6.00
Mt. Clemens,		.75	.20	7.00	. .
Standard of Pontiac,		. .	. .	5.00	. .
Edison of Pontiac,		.60	.10	. .	. .
Port Huron,	W. P.	.65	.15	. .	6.33
Reed City,	W. P.	.50	.10	5.00	. .
Saganaw,		1.00	.15	6.50	. .
Bartlett,		.50	.15	. .	6.25
Swift of Saganaw,		. .	.15	6.25	. .
St. Joseph,		.75	.20	. .	8.00
Traverse City,		.40	.15	5.00	. .
Boardman River of Traverse City,		.40	.15	5.00	. .
Ypsilanti,		.75	.15	. .	5.00
Harrison of Allegan,		.75	. .	. .	5.25
Edison of Allegan,		.75	. .	. .	. .
Athens,		.50	. .	. .	3.00
Pioneer of Au Sable,		.50	. .	. .	5.00

* 1,200 and 2,000 candle-power.

Name.		*Incandescents per Month.*	*Incandescents per Kilowatt.*	*Arcs per Month.* 2,000 *c.p.*	1,200 *c.p.*
Barage,		$0.75	. .	. .	. .
Bronson,		.60	$0.20	. .	$5.00
Buchanan,		.50	. .	4.17	. .
Cairo,		.60	.15	5.00	. .
Carson City,		.75	.13	6.00	. .
Cassopolis,		.40	.12½	5.00	. .
Chelsea,		.75	.15	7.00	. .
Charlevoix,		.50	.10	6.00	. .
Dundee,		.50	. .	. .	5.00
Eaton Rapids,	W. P.	. .	. .	6.00	. .
Fenton,		.50	.15	5.00	. .
Fowlerville,		1.00	. .	5.00	. .
Frankfort,		.50	.20	5.00	. .
Gladwin,	W. P.	.33	. .	4.33	. .
Howard City,		.50	. .	5.00	. .
Holley,		. .	.15	5.00	. .
Homer,		.80	. .	. .	4.25
Imlay City,		.50	. .	. .	4.00
Ithaca,		.50	.15	. .	5.00
Jonesville,		.75	. .	. .	5.00
Calcaska,		2.50	. .	. .	5.00
Leslie,		. .	. .	5.00	. .
Mancelona,		1.00	. .	5.00	. .
Mendon,		.60	.15	5.00	. .
Milford,		.50	. .	. .	4.16
Midland,		.50	. .	. .	5.00
Mt. Pleasant,		.50	.20	. .	4.50
Newaygo,		.50	. .	. .	4.16
Globe of Northville,		.50	. .	5.00	. .
Otsego,		.75	.20	4.00	. .
Petoskey,	W. P.	.50	.15	6.00	. .
Plainville,		.40	. .	. .	. .
Standish,		. .	.15	. .	4.16
St. Louis,	W. P.	.50	. .	7.50	. .
Tecumseh,		.60	. .	. .	5.40
Three Rivers,		.75	.15	5.00	. .
Vassar,		.50	. .	5.00	. .
West Branch,		.50	. .	5.00	. .
Williamston,		. .	.15	5.00	. .
Averages,		$0.66	$0.162	$5.83	$5.20

TABLE VI. Commercial Charges in Michigan.

PUBLIC PLANTS.

Name.		*Incandescents per Month.*	*Incandescents per Kilowatt.*	*Arcs per Month.* 2,000 c.p.	1,200 c.p.
Cold Water,		. .	$0.05	$5.00	. .
East Tawas,		$0.50	. .	. .	. .
Escanaba,		.75	. .	. .	$6.50
Grand Haven,		.25	.10	. .	. .
Grand Ledge,		.60	. .	5.00	. .
Holland,		.40	.15	5.00	. .
Lansing,		.75	.12	6.50	. .
Marshall,	W. P.	.38	.12	3.00	. .
Marquette,	W. P.	.40	. .	6.00	. .
Niles,	W. P.	.50	.08	3.50	. .
Stanton,		.50	. .	. .	. .
St. Johns,		.50	.15	. .	4.80
Wyandotte,		.16⅔	. .	5.00	. .
Chesaning,		.50	.10	3.30	. .
Clinton,		.35	. .	. .	3.50
Crystal Falls,		.50	. .	. .	. .
Durand,		.75	.12	5.00	. .
Evart,		.35	. .	. .	. .
Flushing,		. .	.12	5.00	. .
Hart,		.40	. .	. .	. .
Hillsdale,		1.25	.10	. .	. .
Lowell,	W. P.	.40	.10	. .	4.16
Marlette,		.50	. .	. .	. .
Ovid,		.65	.13	5.00	. .
Oxford,		.50	.10	. .	4.00
Paw Paw,	W. P.	.35	.08	. .	2.00*
Portland,	W. P.	.50	. .	. .	3.33
Shelby,		.30	. .	. .	. .
South Haven,		.35	. .	. .	3.50
St. Clair,		.75	. .	4.00	. .
Thompsonville,		.50	. .	. .	. .
Three Oaks,		.35	. .	5.00	. .
Union City,		.75	.16	. .	. .
Vicksburg,		.50	.12	. .	4.50
St. Ignace,		. .	. .	5.00	. .
Ypsilanti,		. .	. .	3.00	. .
Averages,		$0.506	$0.112	$4.64	$4.03

* 1,200 and 2,000 candle-power.

Tables V. and VI. are summarized in Table VII.

TABLE VII. Summary of Michigan Rates.

Kind of Light.	*No. of Public Plants Compared.*	*Charge by Public Plants.*	*No. of Private Plants Compared.*	*Charge by Private Plants.*	*Per Cent of Excess of Charge in Private Plants.*
INCANDESCENTS — Per month . .	32	$0.506	76	$0.66	30.4%
INCANDESCENTS — Per kilowatt . .	17	11.2	56	16.2	44.6
ARCS, 2,000 c. p. — Per month . .	16	4.64	53	5.83	25.6
ARCS, 1,200 c. p. — Per month . .	9	4.03	28	5.20	29.

It will be noticed that the 76 private companies reporting the charge per month for incandescent lights have an average charge of 66 cents, or 30.4 per cent higher than the 32 public plants that reported an average charge of 50.6 cents.

Where electricity is metered, the 56 private plants reporting on this head have an average rate of charge of 16.2 cents per kilowatt, or 44.6 per cent more than the average rate of 11.2 cents in 17 public plants. The 53 private plants charged for commercial arcs of 2,000 c. p. an average of $5.83 a month, or one-fourth more than the charge of $4.64 in 16 public plants; and 28 private plants charge for commercial arc lights of 1,200 c. p., an average of $5.20 a month, or 29 per cent more than the average of 4.03 in 9 public plants. It is not likely that the comparison of rates in commercial arc lights is as fair as in incandescent lights,

especially where the latter are metered, because there is a great difference in the number of hours burned by commercial arc lights in different places, and by different classes and customers, but the rates quoted are those given in the report of the Michigan Bureau of Labor Statistics. No rate has been omitted unless there is uncertainty as to the proper comparison with other plants; for example, arc lights of 1,400 and 1,600 c. p. are omitted.

Whatever else may be in doubt regarding municipal ownership, it is clearly established that charges to ordinary private consumers are less under that system than under private ownership. Private companies usually make liberal discounts to large consumers, but data are not at hand for comparing such rates with those made by public plants of the same size to equally large consumers.

DISSATISFACTION AND FAILURE.

The most prolific writer in opposition to municipal ownership, Mr. M. J. Francisco, in his 1898 edition of "Municipal Ownership *vs.* Private Corporations," and in a paper read before the street-lighting convention at New Haven, June 18, 1896 (published in the *Progressive Age* for July 1, 1896), gives a list of 22 cities that have become, it is claimed, dissatisfied with city ownership of electric-light plants, and have sold them. What are the

facts? Of the 18 cities from which the writer has been able to hear in the short time after the list was called to his attention, one, Greenville, S.C., never owned its plant. Seven appear still to own their plants, and to be satisfied with them; viz., Titusville, Penn.; Madisonville, Ind.; Lyons and Leon, Ia.; Stockton, Mo.; Hope, Ark.; and Brainerd, Minn. In the case of a ninth, Tacoma, Wash., the city clerk writes: —

"The city plant was originally constructed for a village. We have now 40,000 inhabitants. New engines were added from time to time, until we had about a dozen, with corresponding expense. The Tacoma Railway Co. had surplus power, and could furnish the city power more cheaply than the city could furnish its own. It cost the city 2.64 cents per kilowatt, and we buy at 1.62½ cents. The city did not care to install a new plant, as it is only a question of a few months when cheap water-power will be introduced here, either by the city or private capital. So this arrangement is considered only temporary."

After the failure of the electric plant in private hands at Carrolton, Ga., the city merely took the plant temporarily, until it could get another company to accept the franchise.

Taking up the five others in turn, we come to Michigan City, Ind. After an apparently successful experience, this city suddenly found the cost of operation mysteriously increased from $43 to $80 an arc, at a time when the street railway com-

pany, which had a strong backing with the city government, attempted to buy the plant. The result was a sale of the plant by the city in 1892.

The city of Wabash, Ind., also sold its plant some years ago, but not for $30, as reported by Mr. Francisco; neither did it cost, as he claimed, anywhere near $18,000, if the officials of the city are to be believed.

At Xenia, O., both public and private ownership have failed. The mayor wrote, July 8, 1898: —

"The city built the plant at a cost of $30,000. It was sold for $10,000, and the purchasers failed to pay for it. It is in the hands of a receiver, and no light at present."

The mayor of Marceline, Mo., writes: —

"The electric-light plant was put in by the Thompson-Houston Co. After it had been run some time, the city was induced to buy it for $6,000. The city ran the plant a few years, and gave it up as a bad job, finding it very expensive. After lying idle some time, it was sold to the company now running it for about $800, which was paid in service. The city paid with bonds which were illegally issued, and were never paid. The property was never worth anything like the price paid for it by the city."

The mayor of Moline, Ill., writes: —

"This city owned its own plant, and sold it for $7,500, not because of dissatisfaction, but for the reason that it would have cost about $20,000 to reconstruct it, and the

city could not raise the money. It was sold before my administration; and I always thought it was a wrong move, as I am fully in favor of municipal ownership."

The mayor of Tipton, Ia., writes: —

"Our city formerly owned an electric-light plant. It was burned out, and at that time the city was too heavily involved to put in a new one. They gave a franchise to private individuals to put in a plant, reserving the right of purchase. The ownership of the plant by the city was highly satisfactory, and was the source of some revenue."

The mayor of Portland, Ore., writes: —

"Some five years ago, when Portland, East Portland, and Albina were consolidated into one city, East Portland had a municipal-light plant, which, through the influence over the City Council of the Electric Light Co., was sold to that company. We are now paying to the electric-light monopoly about two prices for lighting, without much hope of deliverance."

So much for complete failures in city ownership, so far as developed by a former president of the National Electric Light Association, who claims to have been gathering exhaustive information on municipal-owned plants ever since 1888 or 1889, when he began to publish on the subject.

Almost equally unfounded is the charge that city ownership, though still continued, is proving very unsatisfactory. In the *Electrical Engineer* for Feb. 17, 1897, appear letters from superin-

tendents or other high officials of 54 city-owned electric-light plants, received by the special investigating committee on commercial lighting of South Norwalk, Conn. Of these replies, 36, or two-thirds, express themselves strongly in favor of city ownership. Of the remaining 18, ten do not touch the question, save as they specify conditions of successful public management. Only four superintendents, or 8 per cent, write unfavorably; and the remaining four are sharply critical rather than distinctly unfavorable. For example, the head of one plant sees no objection to cities of under 20,000 inhabitants doing commercial lighting, and apparently no objection to any city doing street-lighting. Another thinks municipal plants are not so economical or well managed as they should be; and another superintendent writes that city ownership can be made a success when the superintendent is left free to use his own discretion and judgment.

In the present inquiry, during the early part of 1898, replies have been received from over 80 plants. While some of these did not answer all the questions asked, every one replied to the query whether public ownership was satisfactory. All replied favorably and some enthusiastically, with the exception of seven, or about one in twelve, and the superintendent of one of the seven reported good financial results. When requested to particularize

why he was opposed to city ownership, he could scarcely present any reason, except that he did not have the motive for developing the business that he would have if, like his brother who was manager of a private plant, he could invest in the stock of the enterprise for which he was working. The other six plants are Troy, Ala.; Grand Ledge, Mich.; Niles, Mich.; Coal City and Metropolis, Ill.; and Chehalis, Wash. The complaint given most prominence in the replies from these cities was that the charge to private consumers was placed much below cost; but that so large a proportion — over 90 per cent — of the plants heard from have found city ownership satisfactory is very significant.

PUBLIC LIGHTING IN MASSACHUSETTS.

The well-known opponent of public ownership, Mr. Francisco, in an article in *City Government* in April, 1898, attempts to draw conclusions from the Thirteenth Annual Report of the Massachusetts Gas and Electric Light Commission, covering the fiscal year July 1, 1896, to June 30, 1897, which are so unfavorable to city ownership that an examination of his statements is in order.

The charges for street arc lights by private companies in seven of the largest Massachusetts cities, including Boston, Worcester, and Springfield, are compared in his computations with the cost in the

fourteen Massachusetts cities that own their electric-light plants. As the largest of these, Chicopee, had only 16,420 population in 1895, the next largest, Peabody, had only 10,507, and the third largest, Wakefield, had but 8,304, while the others had populations ranging from these figures down to 1,044 in Hull, such a comparison of rates is obviously unfair; and even our critic's computation of the cost in these public plants is incorrect.

Mr. Francisco finds in these plants 985 arc lights of 1,200 c. p. each, and 2,175 incandescents of an average of 27 c. p. each. The latter he assumes equivalent to 48 arcs only. The standard authorities give the cost of a 2,000 c. p. arc as about equivalent to 10 incandescents of 16 c. p., or about 6 of 27 c. p., while the cost of a 1,200 c. p. arc is about 75 per cent of a 2,000 c. p.; so that we may roughly estimate a 1,200 c. p. arc as equivalent to about 4.5 incandescents of 27 c. p. or 4 of 25 c. p. in the cost of operation.

Many of the Massachusetts companies regulate their charges substantially on this basis. In Quincy, for example, the charges are $20 a year for an incandescent of 25 c. p., and $75 a year for one of 1,200; in Arlington the charges are $24 and $90 respectively; Belmont, $22 and $85; Revere, $16 and $72; Gardner, $15 and $75; and Springfield, $24 and $75. On the basis of 4.50 incandescents of 27 c. p. as equivalent to one arc of 1,200 c. p., the

2,175 incandescents in the 14 Massachusetts cities above referred to would be equivalent to 524 arcs, instead of 48, as estimated by Mr. Francisco. It is no wonder that his conclusions would indicate an excessive cost per arc light in a public plant!

On pages 154–155 of this book, in a note to Professor Commons's analysis and comparison of these costs with those of private companies in Massachusetts, attention was called to the important fact, that of the 12 Massachusetts towns that had owned their plants more than one year, eight secured their street lights cheaper than the average of the other towns and cities of the State that had private ownership, and one other of the 12 secured cheaper light, if depreciation be reckoned in 1896–1897 at 3 per cent instead of 5 per cent. In all cases the full interest and depreciation as computed by the Massachusetts Gas and Electric Light Commission is accepted. Of the remaining three towns, Hull had only 1,044 population in 1895, being one of the smallest towns in the State to possess any electric-light plant, and therefore could not be reasonably compared with larger places in the matter of costs, while Braintree had only 5,311 population. The third town, Wakefield, has made such a reduction in cost since June, 1897, that the next report will probably place this town with the majority.

If the public plants of Massachusetts should charge as much for commercial lighting as is the average charge in private plants of the same size in that State, almost every one of the Massachusetts towns having public plants would secure its street lights cheaper than do the remaining towns of the same size in the State.

As indicative of the progress being made in Massachusetts public lighting, even since June, 1897, reference may be made to the four public plants of which recent reports have been obtained by the writer. Wakefield and Middleborough have small gas plants in connection with their electric-light plants, but under the Massachusetts law were forced to pay more for them to the private owners than they seem to have been worth; for the Massachusetts law, in providing very carefully against any wrong to the existing companies when city ownership is begun, often leads to the necessity of a city paying too much for an existing plant. Yet both Wakefield and Middleborough have of late gradually improved the management of their works, and are satisfied that they did wisely to own their plants. In Wakefield, after deducting the receipts from commercial lighting, the net operating expenses of both gas and electric light per arc, if concentrated on the electric-light plant, were $23.47 in the calendar year 1895, $18.27 in 1896, and $11.79 in 1897. The plant was poorly equipped,

and was a financial failure under private ownership.

The net operating expenses above receipts of the Middleborough Gas and Electric Light Plant was $8,310.45 in 1896–1897, or $87.48 for each of the 95 arc lights of 1,200 c. p., and only $3,125.01 in 1897–1898, or $44.64 for each of the 70 lights or their equivalent. For the sake of economy there was some reduction in the number of hours per light, as well as in the number of lights, but not sufficient to account for the great reduction in expense. During the calendar year 1897, Peabody, Mass., reported a total expense, including interest and depreciation, of $74.59, instead of $78.54 for each of its 166 arcs in the year June, 1896, to June, 1897, while the North Attleborough, Mass., plant, during the calendar year 1897, after deducting commercial receipts, but including interest and depreciation, reduces the total net cost of 586 street incandescent lights of 32 c. p. each, burning 1,475 hours per year, from $14.05 per year to $11.20.

The Chicopee plant has been widely advertised as costing $130.69 per arc light of 1,200 c. p., burning 2,654 hours June 30, 1896–1897, and paying $3.40 for coal. But the Gas and Electric Light Commission say that their report should have given the cost as about $112, including 4 per cent interest and 5 per cent depreciation. They

will probably report the cost during 1897–1898 as $95.41,[1] while incandescent light was sold at the very low price for Massachusetts, of twelve cents per kilowatt. If the plant were run to its full capacity, as it probably will be in a short time, from the present rate of growth, the total cost will be about $75 per arc light. At present the fixed charges are abnormally high, because a State board of arbitrators forced the city to pay $27,000 for an old and poor plant, that even if new would not have cost, according to the city's expert, over $12,000. After putting in nearly $70,000 of renewals and extensions, the city is not now using over $5,000 worth of the old plant.

[1] The net operating expenses for the year ending June 30, 1898, after deducting receipts from incandescent lighting and commercial arc lights, was $4,933.37. If to this be added the interest on the plant of $3,290, and 1.9 per cent depreciation, or .3 per cent more than written off on the average in the 83 private plants of Massachusetts in 1896–1897, the net cost to the city of each of its 135 arc lights was $75 in the year just closed. An allowance of 5 per cent for depreciation would raise this to $87.75. These figures, indorsed by the manager of the plant, are disputed, he says, in one point, by the Massachusetts Gas and Electric Light Commission, which claims that $900 expended for replacing wires and poles should be included in operating expenses, instead of in depreciation, as estimated above.

In the neighboring city of Springfield, with over three times the population and over twelve times the consumption of electricity, the average charge is about the same as in Chicopee, although twice as high (one and one-fourth cent per ampere hour) to consumers of less than about $6 (500 ampere hours) per month.

VALIDITY OF ELECTRIC LIGHT COMPARISONS.

In an appendix to this chapter is given a paper by Professor Perrine, of Leland Stanford University, showing the difficulties in comparing different lighting-plants. So far as possible these difficulties have been avoided in the comparisons to follow, by considering together only those plants whose street arc lights burn approximately the same number of hours per year, and where the cost of coal per ton is about the same. Even after all care possible has been exercised to secure fair comparisons between private and public plants, it must still be admitted that the comparisons relate only to the relative cost to the taxpayers and consumers, and do not directly touch the question propounded by Professor Perrine, as to whether private or public ownership procures the production of electric light with the least expenditure of human energy, by reason of utilizing the best-adapted machinery and other equipment, and by the least waste and best supervision of operation.

Too little attention has undoubtedly been paid to this latter problem, but it cannot be properly treated until we have data which it seems hopeless to expect for some years. Meantime we may profitably compare the cost to the taxpayers and consumers. In fact, any system of lighting will probably be preferred by the public, and rightly

so, if it secures lighter burdens to consumer and taxpayer, even though the sum of human energy required by that system be greater than in some other system. As long as the owners of private plants are chiefly the well-to-do, and as long as the greatest industrial problem is the wise distribution of the income of society, most economists will not give the preference to such a system as will give the best engineering results, unless these results be accompanied by greater benefits to taxpayers and consumers than some other system of ownership.

All statistics at hand, however, regarding English electric-lighting plants, and we have far more information regarding them than we have regarding others, indicate that public ownership under civil-service conditions need not fear comparison with private ownership, even in the matter of comparing expenses or the expenditure of human energy. Public ownership, however, will be very much improved in America when the points made by Professor Perrine are fully grasped and acted upon.

BRITISH EXPERIENCE.

In Great Britain the oldest private electric-light plants were established at Eastbourne and Hastings in 1882; London, 1885; and by three other companies in 1887–1888, one of which, the Shef-

field plant, established in 1887, has just been bought by the municipality.

The oldest municipal electric works are those at Bradford, 1889; Brighton and St. Pancras, 1891. In 1882 the British Board of Trade, acting on the authority of Parliament, put such restrictions upon the development of private electric enterprises as greatly to discourage their formation. In 1888 a new Act was passed, in accordance with which the Board of Trade may give what in America would be called a franchise or license, but what in England is called a provisional order, to a private company for 42 years, at the end of which time, and of every 10 years thereafter, the municipality may buy the plant at the then value of the tangible assets, without paying anything for goodwill or prospective profits. Due regard, however, must be taken of the circumstances "that the plant, works, etc., are in such a condition as to be ready for immediate working." The Board of Trade may also give a provisional order to a municipality Such orders, whether for private companies or municipalities, unless utilized, lapse at the end of two years, although they may be renewed.

At the end of 1897, according to the English Municipal Year Book for 1898, there were 121 electric-light works in operation, 67 under municipal management, and 54 in private hands; 41 new plants were being erected, of which 37 were

by public bodies; while 100 cities and towns and only 11 private companies held licenses for new plants. During the year there were 42 applications for provisional orders by public bodies, and 13 by private companies, only five of the latter being granted. The Board of Trade may permit more than one company in the same district, but rarely does so.

According to the famous municipal journal *London*, June 23, 1898, the London private companies have a subscribed capital of £6,012,681; and the stock is worth twice that in the market, because of the high charges of these companies, which have been absolute monopolies without public control. The stock of these companies fell £2,000,000 in value in the week following June 14, when the House of Commons passed bills permitting city competition with these London companies in the two parishes of Marylebone and Bermondsey. The permission to Marylebone was subsequently withdrawn, in part because of the opposition of the friends of municipal ownership who oppose competition with either private or public plants during the life of their franchises. In several large London parishes where private companies have never been established, the people have erected good public plants. The most famous of these is Shoreditch, which has established the first practical scheme for utilizing the heat from dust destructors

for generating electric light. Its combined scheme for a dust destructor, electric-lighting works, public baths and wash-houses, and central library, will cost over £100,000.

The electric-light plant, costing £67,646, was started June 28, 1897, and has been a marked success; although if it cost nothing to destroy in other ways the dust and dirt gathered from the streets, the city might find it nearly as profitable to use coal.

Outside of London, only £1,320,291 of capital is invested in private electric-light plants of any importance. There are only two such plants in cities of 100,000 population; viz., Newcastle and Norwich. The other most important places are the minor cities, at least in size and business, Cambridge, Oxford, Northampton, Reading, Scarborough, Hastings, Hove, Eastbourne, Dover, Bournemouth, Chatham, and Chelmsford. Evidently public ownership of electric-light plants in Great Britain is sweeping everything before it.

A writer, Claud P. D'oyle, in the *Electrical Engineer* for April 14 and 21, 1898, selects 14 public and 15 private companies, of approximately the same size, the 14 public companies having an average daily output of 882 kilowatts, and the 15 private companies an average of 998 kilowatts; yet the average capital per kilowatt in the public plants was $4.18, and in the private $6.55, while

the average capital per lamp, apparently incandescent lamps, was $13.25 in the public plants and $17.80 in the private plants; i.e., the private plants were trying to earn interest and other fixed charges on 50 per cent more capital for the same output than were the public companies.

It is no wonder that the Municipal Year Book states that the "private supply of electricity has almost come to a standstill, and will have to confine its progress to the area already under its control."

The following letter in the United States Consular Reports for April, 1898, from Consul-General Dubois, of St. Gall, Germany, gives certain facts relating to municipal electric light and power in Germany: —

"In the following cities in the German Empire, the municipal authorities own and manage the electric works that supply light and power, — Bremen, Barmen, Cassel, Darmstadt, Düsseldorf, Elberfeld, Hanover, Cologne, Königsberg, Lubeck, Pforzhein. All of these cities, with the exception of Hanover, also own the gas-works. The following cities have constructed electric works for the purposes of light and power, but have leased the management of the same to private operators, — Aix-la-Chapelle, Chemnitz, Frankfort, Strasburg, and Stuttgart, all of which, with the exception of one, Chemnitz, are cities where the gas-works are under the management of private corporations. In the following cities, private companies have established electric works, with the agreement that, under certain conditions, the municipal authorities shall have the privilege of securing

absolute control and ownership by purchase, — Altuna, Dessau, Gera, Hagen, Heilbronn, Leipsic, Mülhausen, Stettin, and Zwickau. Of these cities, the gas-works are under private control in Dessau, Hagen, Mülhausen, and Zwickau."

METHODS OF COMPARISON.

In the following 21 tables, 74 public plants have been compared with 132 that are privately owned. Every public plant, no matter how poorly managed, from which adequate data could be obtained in the limited time at command, is here given.

When a public lighting-plant is combined with public water-works, the effort has been made to apportion the expenses to each plant according to the work done. Where a city, however, already operates its water-works, only the additional expenses entailed by the lighting-plant actually represent any added cost of the latter, and are the only expenses that need to be apportioned to the electric lighting.

The total cost of each arc light is computed by deducting from the operating expenses receipts from commercial and domestic lights, where there are such, and adding 5 per cent on the value of the plant for interest, and 5 per cent more for depreciation. Taxes may be ignored, in accordance with the principles brought out by Professor Commons in the previous chapter. For the benefit, however, of those who insist on a larger allowance

for taxes and depreciation, another column, No. 10, is given in nearly every table of public plants. In this the cost is given with 7½ per cent for depreciation and taxes; although the average allowance of all the private plants owned by Massachusetts companies for depreciation in 1896 and 1897, as has been shown, was under 2 per cent, and taxes average less than 1 per cent of assets in most States, and less than 1¼ per cent even in Massachusetts, where such taxes are unusually high.

In arriving at the value of the plants on which the interest and depreciation are obtained, the cost of a plant as reported by the officials, together with the new construction added from time to time, has been depreciated 5 per cent yearly. It would be obviously unfair to charge a plant with yearly depreciation costs unless the amount so charged is actually set aside for reducing the capital account created by the cost of original construction and extensions.

No more clever deception has been attempted upon an unsuspecting public than appears in the requirement in Massachusetts that every public lighting company shall return, as part of the cost of light, 5 per cent depreciation, while these companies are not forced actually to set aside such a fund, although another provision of law requires the payment of municipal gas and electric-light bonds within thirty years. The practical result is,

that the interest charge per arc light does not decline at all by reason of this book-keeping device. Simply the apparent cost of light in the public companies is made to appear high by virtue of a charge on the books of over twice the percentage of depreciation set aside on the average by the eighty-two private companies of the State. For example, if a plant costs for construction $200 per light, it is not fair to charge 5 per cent, or $10 as a depreciation cost, unless the $10 is so spent that the next year the capital account on which interest is paid is reduced to $190.

In this investigation, however, unless expressly stated to the contrary, the annual depreciation charge of five per cent has been deducted from the cost of the plants, as well as included in yearly expenses, in order to arrive at the present proper capitalization.

Where cities have not so reduced their capital account, they have not been at more than two per cent expense annually, in most cases for renewals, other than are included in regular repair accounts.

The total number of street and commercial arcs, and the total number of incandescents used by private plants, is obtained from the *American Electrical Directory*, for the first quarter of 1898. All the other data in these tables are taken from Bulletin No. 4112, issued Aug. 16, 1897, by the General Electric Company, at Schenectady, New York.

This Bulletin gives returns, claimed to be accurate, from 500 different plants, in all parts of the country, using the arc apparatus of the General Electric Company. Every private plant in this Bulletin, where the rates are clearly given and which comes in the same class regarding hours, price of coal, etc., with the public plants, is quoted. As the Bulletin of the General Electric Company was issued near the end of 1897, and is supposed to present the latest information for such plants, the dates of the fiscal years of the two classes of plants in all these tables are practically identical.

In arriving at the average cost for each of the following tables, for both public and private plants, the attempt has been made merely to give the average of costs less commercial receipts of the several companies, rather than to weight each company with its relative importance as measured by the total number of lights. The method used, when applied to large numbers of companies selected as in these tables, is as fair as any other method of comparison. To avoid decimals the unit of cost is taken as 100 hours, instead of one hour.

It is believed that this is the first extensive comparison of public and private electric-lighting plants wherein only plants burning approximately the same number of hours and paying the same price for fuel are compared. The comparison is still unfair to the public-owned plants in one re-

spect,— thirty-nine of the seventy-three plants, or over one-half, do not have the advantage of a combination of street with commercial and domestic lighting, to say nothing of the fact that where such lighting is done by the public plants the charges are usually less than in the case of private companies, and consequently the opportunity to make a strong financial showing by a low net cost of arc lights is correspondingly lessened. No better authority can be found for this claim that cities doing only street-lighting are handicapped than the statement of Mr. Alex Dow, general manager of the Detroit Edison Illuminating Company:[1]

"In performing this service [the supply of commercial light by a private company], there will be built and equipped a power-house; there will be organized an operating and a managing force; there will be constructed lines of distribution. All of these may be, and part of them certainly will be, adapted to the performance of public lighting, in addition to the service of private consumers. To whatever extent this double adaptability exists in the private plant, there will be a duplication of equipment in any other plant separately established for performance of the public work. Moreover, it is peculiarly characteristic of public lighting operated all night, that its addition to the ordinary work of a private lighting-plant tends to reduce the average cost of the combined output. In these considerations rests the possibility of a contractor profitably per-

[1] Paper before Twenty-first Convention of the National Electric Light Association, June 8, 1898.

forming public lighting for a city at or below the price at which the city can itself do the work, and yet it being to the interest of the contractor to undertake the business."

This condition of affairs makes even more striking the lesson of the accompanying tables, numbers XIII. to XXXII. inclusive, which may be thus stated: When lighting-plants in considerable numbers are grouped according to candle-power, hours burned, cost of coal, size, etc., the average charge by private companies in every group, so far as this investigation has been able to go, is more than the cost in public companies, even where, in addition to five per cent interest, seven and one-half per cent is allowed for depreciation, loss of taxes and other items possibly omitted from these public reports.

As will be discussed later in this book, there are strong reasons for city ownership, quite independent of the financial side; but the figures of cost here given will interest all who fear that city ownership of municipal monopolies is not and cannot become a financial success in this country.

The tables need no special explanation, but may be omitted by the casual reader.

TABLE VIII. Public Plants. 2,000 c. p. Under 1,800 Hours. A. Non-Commercial.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Price of Coal per Ton.	5 No. Street Arcs.	6 Value of Physical Plant.	7 Operating Expenses per Street Arc.	8 Cost per Arc per Year. Interest and Depreciation 5% each.	9 Cost per 100 Hours.	10 Cost per 100 Hours at 7½% Depreciation and Taxes.	11 No. Private Arcs.	12 No. Private Incandescents.	13 Fiscal Year.	14 Remarks.
Carthage, O. . . .	2,257[1]	1500	$2.05	45	$12,000	$55.56	$82.23	$5.48	$5.85	. .	. .	Apr. 1, '97-8	w.w.[2]
Ypsilanti, Mich. .	7,000	1643	2.00	90	14,400	33.33	49.33	3.00	3.25	. .	. .	May 1, '96-7	
Morgan Park, Ill.,	2,500	1250	2.00	50	5,000	70.00	80.00	6.40	6.60	. .	. .	May 1, '96-7	
Salisbury, Mo. . .	3,000	1220	1.50	40	15,467	38.67	51.40	4.29	4.53	. .	. .	Apr. 1, '97-8	
Averages . . .	3,689	1403	$1.89	56	$11,717	$49.39	$65.74	$4.79	$5.06				
B. Commercial.													
Clyde, Ohio. . . .	3,000	1220	$2.01	51	$14,000	$26.69	$53.54	$4.39	$4.93	. .	750	Mar. 15, '96-7	
Coldwater, Mich. .	5,550	1665	2.25	79	37,450	10.02	42.96	4.59	3.08	22	3450	Apr. 1, '96-7	w.w.
Holland, Mich. . .	9,000	1659	2.50	48	34,091	8.64	79.64	4.80	5.85	10	3620	Mar. 15, '97-8	w.w.
St. Peter, Minn. .	3,671	1100	3.15	49	14,350	20.00[3]	49.28[3]	4.48	5.15	2	1250	Apr. 1, '96-7	
Averages . . .	5,305	1411	$ 2.48	57	$24,973	$16.34	$56.36	$3.57	$4.75	. .	2268		

1. Census, 1890. 2. Combined with water-works. 3. Approximately.

TABLE IX. Private Plants. Under 1,800 Hours. A. 2,000 c. p.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Price of Coal per Ton.	5 No. Street Arcs.	6 Total No. Arcs.	7 Total No. Incandescents.	8 Charge per Year for Street Arcs.	9 Charge per 100 Hours for Street Arcs.	10 Estimated Cost for 2,000 c. p. per 100 hours.
Rockville, Ind. . .	2,000	1550	$1.50	27	50	500	$ 70.00	$4.52	
McPherson, Kan. .	3,172[1]	1220	2.30	18	70	600	60.00	4.92	
Manitou, Colo. . .	2,000	1550	2.35	15	60	2,500	126.00	8.13	
Averages. . . .	2,391	1440	$2.05	20	60	1,200	$ 85.33	$5.86	
B. 1,200 c. p.									
Vincennes, Ind. . .	12,000	1400	$ .65	10	35	3,800	$96.00	$6.86	$9.20[3]
Princeton, Ill. . .	5,382	1460	.80	11	42	1,481	72.00	4.93	6.53[3]
Canton, Ill. . . .	7,500	1220	1.25	122	175	1,800	36.00	2.95	3.87[3]
Monroe, Wis. . . .	4,000	1220	2.70	60	60	1,200	72.00	5.90	7.87[3]
Racine, Wis. . . .	27,000	1550	2.27	192	250	6,000	68.50[2]	4.42	5.89[3]
Averages. . . .	11,176	1370	$1.53	79	112	2,856	$68.90	$5.01	$6.67[3]

1. 1890 Census. 2. Average of the price of $58 charged for some lights and $79 for others.

3. This is on the assumption that it costs one-third more to produce lights of 2,000 c. p. than those of 1,200 c. p. This assumption is probably true of operating expenses, but high for fixed charges.

TABLE X. Public Plants. 1,800 to 3,000 hrs. Coal, 0 to $1.99 a ton. A. Non-Commercial.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Price of Coal per Ton.	5 No. of Street Arcs.	6 Value of Physical Plant.	7 Operating Expenses per Street Arc.	8 Cost per Year per Street Arc with interest and depreciation 5% each.	9 Cost per 100 Hours.	10 Cost per 100 Hrs. at 7½% depreciation, and taxes.	11 No. of Private Arcs.	12 No. of Private Incandescents.	13 Fiscal Year.	14 Remarks.
Painesville, O. . .	6,000	1,800	$1.65	85	$12,500	$45.61	$60.32	$3.35	$3.56	. .	. .	Mar. 15, '97-98	
Columbus, Ind. . .	10,000	2,200	1.69	82	11,000	46.00	59.42	2.70	2.81	. .	. .	June 1, '96-97	
Marion, Ind. . . .	15,000	2,200	.50[1]	118	24,000	35.64	55.98	2.63	2.78	. .	. .	May 16, '97-98	
Aurora, Ill. . . .	19,688[2]	2,527	1.75	206	51,460	50.01[3]	66.16	2.62	2.78	. .	. .	1896	
Bloomington, Ill. .	27,000	2,565	1.65	307	83,000	51.30	78.34	3.05	3.32	. .	. .	May 1, '97-98	
Elgin, Ill.	20,000	2,240	1.93	156	30,000	52.85	72.08	3.22	3.43	. .	. .	1896	
Bay City, Mich. . .	34,000	2,623	1.75	209	39,000	42.27	54.47	2.08	2.19	. .	. .	Mar. 1, '96-97	
St. Joseph, Mo. . .	60,000	2,700	1.05	355	95,000	57.01[4]	64.54	2.39	2.52	. .	. .	Apr. 20, '97-98	
Dunkirk, N.Y. . . .	9,416[2]	2,809	1.45	75	21,012	39.56	65.97	2.34	2.55	. .	. .	Mar. 1, '96-97	w. w.
Bowling Green, Ky.	12,000	2,179[5]	1.28	72	10,000	42.03	56.03	2.57	2.75	. .	. .	Feb. 28, '97-98	
Decatur, Ill. . . .	27,000	2,179	1.25	156	24,700	34.00	50.00	2.30	2.48	. .	. .	May 1, '97-98	w. w.
Averages	21,828	2,366	$1.45	166	$36,516	$45.12	$62.12	$2.66	$2.83				

1. Natural gas computed by officials as equivalent to coal at 50cts., since it costs $5.08 per arc per year.

2. Census, 1890. The figures of cost are those obtained by Professor Commons from the books of the Dunkirk plant, and apparently only include in operating expenses the increased cost above that formerly borne by the water-works.

3. Returns just received give operating expenses in 1897 as $9,297.95, or $44.98 per arc light, if the same number of lights (206) were used as in 1896.

4. Superintendent believes operating expenses in 1898 will fall to $50.

5. Assumed in absence of a report on this head.

TABLE X. Public Plants. — (*Continued.*) B. Commercial.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Coal per Ton.	5 No. Street Arcs.	6 Value of Physical Plant.	7 Operating Expenses per Street Arc.	8 Cost per Year per Street Arc, with Interest and Depreciation at 5%.	9 Cost per 100 Hours.	10 Cost per 100 Hrs. Interest and Depreciation at 7½%.	11 No. Private Arcs.	12 No. Private Incandescents.	13 Fiscal Year.	14 Remarks.
Marietta, Ohio .	8,273 [1]	2179	$ .90	104	$10,000	$34.89	$44.50	$2.04	$2.15	9	. .	Mar. 1, '97-98	
London, Ohio . .	5,000	2179	1.81	72	22,000	27.22	57.78	2.65	2.99	. .	1,200	Aug. 1, '96-97	
Oxford, Ohio . .	1,922	2179	1.50	41	16,770	surplus 4.23	36.67	1.68	2.15	. .	. . [3]	Mar. 13, '96-97	
Logansport, Ind. .	18,000	2179	1.65 [2]	162	84,287	surplus 27.59	24.44	1.12	1.72	42	10,000	1897	
Hannibal, Mo. . .	16,000	2179	1.40	87	50,292	.79	40.79	1 87	2.33	. .	4,448	May 31, '96-97	
Harrisonville, Mo.	1,645 [1]	2200	1.68	25	14,575	surplus 12.20	46.08	2.09	2.76	13	750	1897	
Averages . . .	8,473	2182	$1.49	82	$33,154	$3.15	$41.71	$1.91	$2.35				

1. 1890 Census.
2. Natural gas, computed by officials as equal to coal at $1.65.
3. Not reported, but receipts of $5,094.92 for incandescents indicate perhaps 1,000.

TABLE XI. Private Plants. 2,000 c. p. 1,800 to 3,000 hours. Coal, 0 to $1.99.

1 Place.	2 Population.	3 Hours per Year.	4 Coal per Ton.	5 No. Street Arcs.	6 Total No. of Arcs.	7 Total No. of Incandescents.	8 Charge per Year for Street Arcs.	9 Charge per 100 Hours for Street Arcs.	10 Remarks.
Huntington, Pa.	6,000	1,825	$1.50	51	52	1,300	$60.00	$3.30	
Canton, O.	38,000	2,179	1.55	155	360	4,300	62.50	2.90	
Columbus, O.	130,000	2,179	1.00	990	. .	. .	74.50	2.87	
Elyria, O.	10,000	1,825	1.40	68	80	1,200	75.00	4.11	
Pomeroy, O.	5,500	2,179	.87	27	63	1,300	89.00	4.08	
Youngstown, O.	43,000	2,179	1.35	349	. .	10,000	64.00	2.93	
Janesville, O.	30,000	2,179	1.50	215	315	2,100	75.00	3.44	
Indianapolis, Ind.	185,000	2,179	1.25	1,100	1,800	3,200	85.00	3.90	
Belleville, Ill.	19,000	2,179	.65	138	210	1,125	80.00	3.67	
Cairo, Ill.	15,000	1,825	1.75	28	80	4,000	64.80	3.55	
Danville, Ill.	16,000	2,179	.60	121	260	800	80.00	3.66	
Havana, Ill.	3,000	2,250	.90	42	48	1,500	72.00	3.20	
Lincoln, Ill.	10,000	2,179	.50	62	130	3,000	60.00	2.80	
Litchfield, Ill.	6,500	2,250	1.25	43	100	. .	75.00	3.33	
Quincy, Ill.	45,000	2,250	1.00	258	. .	1,650	75.00	3.33	
Waukesha, Wis.	8,000	2,920	1.50	67	70	500	78.00	3.73	
Burlington, Io.	30,000	2,179	.95	122	. .	. .	100.00	4.59	
Davenport, Io.	35,000	2,179	1.35	99	106	7,000	56.00	2.57	
Des Moines, Io.	80,000	2,179	1.00	158	. .	6,500	96.00	4.40	
Grinnell, Io.	4,000	2,179	1.85	28	34	1,500	83.33	3.82	
Clinton, Mo.	7,000	2,179	1.85	45	50	. .	85.00	3.90	
Ft. Scott, Kan	12,000	2,250	1.05	75	. .	. .	84.00	3.73	
Lincoln, Neb.	50,000	1,825	1.90	176	350	4,000	96.00	5.26	
Newport, Ky.	50,000	2,179	1.00	108	. .	. .	100.00	4.59	
Averages	34,917	2,163	$1.23	189			$77.92	$3.65	

TABLE XII. Public Plants. Operated by Water-Power.

1 Place.	2 Present Estimated Population.	3 No. of Hours.	4 Coal per Ton.	5 Street Arcs.	6 Value of Physical Plant.	7 Operating Expenses per Street Arc.	8 Cost per Year per Street Arc, with Interest and Depreciation 5% ea.	9 Cost per 100 Hrs. With Depreciation 5%.	10 Cost per 100 Hrs. at 7½% Depreciation and Taxes.	11 No. Private Arcs.	12 No. Private Incandescents.	13 Fiscal Year.	14 Remarks.
Bangor, Me. . .	20,000	3,650	W. P.	156	$22,750	$38.46	$58.04	$1.45	$1.56	. .	. .	1897	
Brainerd, Minn.	5,703[1]	2,920	"	40[2]	25,000	surplus 75.00	surplus 12.50	surplus .43	.52	. .	1,900	Nov. 1, '96-97	
Lewiston, Me. .	21,701	2,179	"	150[3]	20,000[4]	45.00	58.33	2.66	2.89	. .	. .	1897	
Marshall, Mich.	5,000	1,975	"	81	38,000	. .	46.92	2.38	2.96	39	1,800	. .	
Muncie, Ind. . .	25,000	2,823	nat'l gas[5]	149	22,000	35.80	50.64	1.79	1.92	. .	. .	1897	
Niles, Mich. . .	5,000	2,179	"	75	36,582	surplus 21.42	25.48	1.16	1.31	23	2,008	Apr. 1, '96-97	
Paw Paw, Mich.	1,300	1,825	"	32	19,500	surplus .10	62.40	3.42	4.27	26	1,500	Mar. 25, '96-97	
Averages .	11,958	2,636		98	$26,262	$3.25	$38.47	$1.78	$2.20				

1. Census, 1890.

2. Counting 100 public incandescents, located probably in public buildings, as equal to at least four arcs.

3. Some of the arcs are 1,200 c. p., but how many is not discovered. Anyway the average of the seven plants would not be materially changed if two-thirds were of 1,200 c. p.

4. Original cost of $14,000 in 1887 and of $6,000 subsequently, at 5 per cent depreciation, would have been worth over $13,000 now, or $86.67 per arc light.

5. The natural gas comes from wells owned by the city.

TABLE XIII. Private Plants. 2,000 c. p. Water-Power. Over 40 Street Arcs.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Number Street Arcs.	5 Price per Year per Street Arc.	6 Price per 100 Hours.	7 Remarks.
Sacramento, Cal.	35,000	3,680	240	$123.00	$3.34	
Aspen, Colo.	7,000	4,000	51	90.00	2.25	
Augusta, Ga.	46,000	4,000	314	70.00	1.75	
Boyce, Ia.	7,500	4,000	47	108.00	2.70	
Auburn, Me.	12,500	2,179	90	50.00	2.29	
Calais, Me.	7,500	1,825	42	60.00	3.29	
Big Rapids, Mich.	5,200	4,000	50	41.00	1.03	
St. Cloud, Minn.	9,178	4,000	42	85.00	2.13	
Fulton, N.Y.	5,000	1,825	40	60.00	3.29	
Oswego, N.Y.	25,000	4,000	213	81.00	2.03	
Rochester, N.Y.	160,000	4,000	2,248	91.25	2.28	
Sandy Hill, N.Y.	3,500	2,179	43	84.00	3.86	
Seneca Falls, N.Y.	7,000	2,000	77	65.00	3.25	
Watertown, N.Y.	20,000	3,430	165	82.12	2.39	
Portland, Ore.	81,000	4,000	655	103.20	2.58	
Averages	28,759	3,274	288	$79.57	$2.56	

TABLE XIV. Public Plants, 2,000 c. p. 1,800 to 3,000 Hours. Coal, $2.00 to $3.00.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Price of Coal per Ton.	5 No. of Arcs.	6 Value of Physical Plant.	7 Operating Expenses per Street Arc.	8 Cost per Year per Street Arc with interest and depreciation 5% ea.	9 Cost per 100 Hours.	10 Cost per 100 hrs. at 7½% Depreciation, and Taxes.	11 No. of Private Arcs.	12 No. of Private Incandescents.	13 Fiscal Year.	14 Remarks.
Frederick, Md. . . .	10,000	2,179	$2.85	76	$17,500	$56.58	$79.61	$3.64	$3.92	. .	. .	Jan. 31, 1897-98	
St. Charles, Mo. . .	6,161 [2]	2,920	2.00	80	15,000	56.25	75.00	2.67	2.73	. .	. .	July 1, 1897-98	
Topeka, Kan. . . .	35,000	2,195	2.00	264	48,170	41.48	59.73	2.72	2.93	. .	. .	June 1, 1897-98	
Little Rock, Ark. . .	40,000	2,453	2.55	212	35,000	41.28	51.28	2.09	2.19	. .	. .	1897	
Rochelle, Ill. . . .	3,000	2,179	2.10	40	10,000	32.72	57.72	2.64	2.94	20	1500	May 1, 1896-97	
Miamisburgh, O.. . .	2,952	2,179	2.75	53	12,380	65.19	88.55	4.04	4.33	. .	. . [1]	1897	
Averages	16,186	2,351	$2.38	121	$23,008	$48.92	$68.65	$2.97	$3.17				

1. Not reported. 2. Census 1890.

TABLE XV. Private Plants. 2,000 c. p. 1,800 to 3,000 Hours. Coal, $2.00 to $2.99.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Coal per Ton.	5 No. Street Arcs.	6 Total No. Arcs.	7 Total Incandescents.	8 Charge per Year per Street Arc.	9 Charge per 100 Hours for Street Arcs.	10 Remarks.
New Bedford, Mass. . . .	65,000	2,179	$2.00	190	395	20,638	$138.75	$6.37	
Canastota, N. Y.	3,000	"	2.25	42	44	1,400	72.00	3.30	
Barbertown, O.	3,500	"	2.00	45	53	900	72.00	3.30	
La Porte, Ind.	8,000	1,825	2.20	110	172	12,856	62.50	3.42	
South Bend, Ind.	30,000	"	2.25	157	180	6,000	70.00	3.84	
Fort Wayne, Ind.	49,000	2,250	2.00	260	600	16,000	120.00	6.58	
Ann Arbor, Mich.	14,500	1,815	2.50	102	130	2,000	60.00	3.31	
Oconomowoc, Wis.	3,175	1,890	2.50	39	50	1,500	96.00	5.08	
Sioux City, Ia.	30,000	2,250	2.30	100	230	3,000	95.00	4.22	
Hutchinson, Kan.	8,324	2,179	2.50	34	77	2,785	100.00	4.59	
Colorado Springs, Col. . .	22,000	"	2.00	101	180	20,000	108.00	4.96	
Columbus, Ga.	19,303	"	2.00	120	226	7,000	85.00	3.90	
Averages	21,317	2,077	$2.21	108	195	7,923	$89.94	$4.41	

TABLE XVI. Public Plants, 2,000 c. p. 1,800 to 3,000 Hours. Coal, over $3. A. Non-Commercial.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Price of Coal per Ton.	5 No. of Arcs.	6 Value of Physical Plant.	7 Operating Expenses per Street Arc.	8 Cost per Year per Street Arc with interest and depreciation 5% ea.	9 Cost per 100 Hrs. with depreciation 5%.	10 Cost per 100 Hrs. at 7½% depreciation, and taxes.	11 No. of Private Arcs.	12 No. of Private Incandescents.	13 Fiscal Year.	14 Remarks.
So. Park, Chicago,	1,438,110[1]	2,133	$3.90	490	$141,926	$42.02	$70.98	$3.33	$3.63	. .	. .	Nov. 30, '96-97	
Galveston, Tex. .	50,000	3,000	4.00	300	65,000	66.67	84.73	2.82	2.98	. .	. .	Mar. 1, '97-98	
Averages . . .	744,055	2,567	$3.95	395	$103,463	$54.35	$77.86	$3.08	$3.31				
B. Commercial.													
						Surplus.							
Alameda, Cal. . .	15,000	2,373	$6.25	103	$70,000	$.77	$56.08	$2.37	$2.95	2000	. .	Jan. 1, July 1, '97	

1. Census, 1890.

TABLE XVII. Private Plants, 2,000 c. p. 1,800 to 3,000 Hours. Coal, over $3.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Coal per Hour.	5 No. Street Arcs.	6 Total No. Arcs.	7 Total No. Incandescents.	8 Charge per Year for Street Arcs.	9 Charge per 100 Hrs. for Street Arcs.	10 Remarks.
New Britain, Conn. .	23,000	2,190	$6.00	119	260	12,912	$ 93.00	$4.25	
Long Branch, N.J. .	10,000	2,555	3.30	180	. .	14,000	100.00	3.91	
Minneapolis, Minn. .	215,000	2,179	3.50	578	1,800	21,000	115.00	5.23	
Dubuque, Ia.	45,000	2,179	5.50	311	405	6,000	65.00	2.99	
Dallas, Tex.	50,000	2,179	3.00	245	. .	. .	100.00	4.58	
Oakland, Cal. . . .	75,000	2,700	5.25	500	. .	2,500	121.50	4.50	
Averages	69,667	2,330	$4.43	322	. .	. .	$99.08	$4.24	

TABLE XVIII. Public Plants. 2,000 c. p. Over 3,000 Hours. Coal, $0.75 to $1.15.

1 Place.	2 Estimated Present Population.	3 No. of Hours.	4 Coal.	5 Street Arcs.	6 Value of Physical Plant.	7 Operating Expenses per Street Arc.	8 Cost per Year per Street Arc, with Interest and Depreciation 5% each.	9 Cost per 100 Hrs., with Depreciation 5%.	10 Cost per 100 Hrs., at 7% Depreciation, and Taxes.	11 No. Private Arcs.	12 No. Private Incandescents.	13 Fiscal Year.	14 Remarks.
Allegheny, Pa.	125,000	4,105	$.90	1,146	$358,903.00	$49.46	$71.78	$1.75	$1.88	. .	. .	Feb. 9, '97–8	
Wheeling, W. Va.	40,000	4,000	.83	450	104,000.00	46.15	69.31	1.73	1.88	. .	. .	1897	
Newark, O. . .	14,270	3,285	.93	226	40,000.00	32.61	50.31	1.53	1.66	. .	. .	Apr. 1, '97–8	
Paducah, Ky. .	22,000	4,000	1.10	120	17,000.00	58.33	72.50	1.81	1.91	. .	. .	June 1, '97–8	
Averages .	50,318	3,848	$.94	486	$129,976.00	$46.64	$65.98	$1.71	$1.83				

TABLE XIX. Private Plants. Over 100 Street Arcs. Coal, $0.75 to $1.25.

1 Place.	2 Estimated Present Population.	3 Hours.	4 Coal per Ton.	5 No. Street Arcs.	6 Price per Year.	7 Price per 100 Hrs.	8 Total Arcs.	9 Total Incandescents.
Altoona, Pa.	30,337 [1]	4,000	$1.25	200	$84.00	$2.10	500	6,000
McKeesport, Pa.	35,000	"	1.05	185	75.00	1.88	445	8,000
Pittsburg, Pa.	238,617 [1]	"	1.01	1,900	96.00	2.40	2,220	99,000
Akron, O.	35,000	3,680	1.05	268	88.00	2.39	448	17,000
Mt. Vernon, O.	6,027 [1]	3,200	1.00	101	72.00	2.25	140	300
Joliet, Ill.	23,264 [1]	4,000	.80	265	95.00	2.38	475	3,750
Peoria, Ill.	41,024 [1]	"	1.25	414	98.00	2.45	450	15,000
Ottumwa, Ia.	17,000	"	.85	120	80.00	2.00	160	1,200+
Des Moines, Ia.	80,000	"	1.00	139	126.00	3.15	275	6,000
Louisville, Ky.	210,000	3,840	1.00	1,219	84.00	2.19	1,540	40,000
Chattanooga, Tenn.	49,710	4,000	1.05	200	87.00	2.18	450	4,000
Atlanta, Ga.	100,000	"	1.10	585	85.00	2.13	1,000	21,000
Averages	72,165	3,893	$1.03	466	$89.00	$2.29	675	18,439

TABLE XX. Public Plants. 2,000 c. p. Over 3,000 Hours. Coal, $1.50 to $2.25.

A. Non-Commercial.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Price of Coal per Ton.	5 No. of Arcs.	6 Value of Physical Plant.	7 Operating Expenses per Street Arc.	8 Cost per Year per Street Arc, with Interest and Depreciation 5% ea.	9 Cost per 100 Hrs., with Depreciation 5%.	10 Cost per 100 Hrs., at 7% Depreciation, and Taxes.	11 No. of Private Arcs.	12 No. of Private Incandescents.	13 Fiscal Year.	14 Remarks.
Meadville, Pa. .	9,520[1]	3,500	$2.16	109	$20,000	$50.46	$68.81	$1.97	$2.10	. .	. .	Apr. 1, '97-8	
Titusville, Pa. .	8,073[1]	4,000	about 1.78[2]	114	7,344	46.54	59.20	1.48	1.56	. .	. .	Apr. 4, '96-7	
Detroit, Mich. .	250,000	3,786	2.22	1,744	716,389[3]	51.85	83.84[4]	2.21	2.42	. .	. .	June 30, '97-8	
Kalamazoo, Mich.	20,000[1]	3,036	1.92	200	42,060	64.36	85.39	2.81	2.99	. .	. .	1897	
Sherman, Tex. .	7,335[1]	4,015	2.25	64	12,800	50.00	70.00	1.74	1.86	. .	. .	Apr. 1, '96-7	
Batavia, N. Y. .	7,221[1]	3,407	1.92	103	25,778	42.69	67.72	1.90	2.17	. .	. .	Aug. 31, '96-7	
Easton, Pa. . . .	14,481[1]	3,833	2.85	141	43,500	79.87	95.29	2.49	2.59	. .	. .	May 1, '97-8	
Averages . .	45,233	3,654	$2.16	353	$123,982	$55.11	$75.74	$2.09	$2.24				

1. Census, 1890.

2. Connected with Waterworks.

3. The entire cost of the plant has been $790,145.73; but this includes 3,901 incandescent lights, worth $73,755.93 if the allowance of $18.93 per light named in the 1897 report still holds good.

4. How this figure is reached is explained in the text.

TABLE XX. Public Plants — (*Continued*). B. Commercial.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Price of Coal per Ton.	5 No. of Arcs.	6 Value of Physical Plant.	7 Operating Expenses per Street Arc.	8 Cost per Year per Street Arc, with Interest and Depreciation 5% each.	9 Cost per 100 Hours, with Depreciation 5%.	10 Cost per 100 Hrs., at 7 3/4% Depreciation, and Taxes.	11 No. of Private Arcs.	12 No. of Private Incandescents.	13 Fiscal Year.	14 Remarks.
Middletown, Pa.	8,000	4,000	$1.95	60	$28,000	$46.66	$109.69	$2.74	$3.14	60	120	Feb. 27, '97-8	
Hamilton, O.[1] . .	25,000	4,000	1.60	208	100,000	43.69	92.23	2.31	2.61	2	3,828	1897	
Shelby, O. . . .	6,000	4,000	1.81	65	35,000	9.08	62.93	1.57	1.91	2	1,527	Apr. 1, '97-8	
Lansing, Mich. .	13,102[2]	4,015	2.25	124	96,582	26.68	92.54	2.35	2.72	40	. .[4]	June 1, '96-7	
Jacksonville, Fla.	25,000	4,000	3.00[3]	122	90,000	surplus 16.50	19.64	.49	.72	116	7,321	1896	
Ames, Ia.	2,600	3,500	1.55	21[5]	16,160	surplus 82.30	surplus 5.30	surplus .15	.26	2	1,200	Apr. 1, '97-8	
Averages . .	13,284	3,919	$2.03	100	$60,957	$4.55	$61.96	$1.55	$1.89	54	2,799		

1. Data in columns 7, 8, 9, 10, computed from report for Feb. 1 — Dec. 31, 1897, allowance being made for January at average of the other months; but there may be more than two private arc lights, though the income therefrom was only $100 in 11 months. Part of the 3,828 incandescent lights may be used in public buildings. The report gives $7,919.86 as the total receipts, less $1,220.83 charged for public buildings. The cost for the 11 months was $14,948.85, leaving the net cost $8,249.79.

2. Census 1890.

3. Wood at $2.10; probably not equal to coal at $3.

4. The incandescents are metered, and no account is kept of their number.

5. 15 arcs and 31 incandescents of 32 c. p., equivalent to about 6 arcs, or a total of 21 arcs.

6. Average of five plants.

TABLE XXI. Private Plants. 2,000 c. p. Over 3,000 Hours. Coal, $1.60 to $2.25. Street Arcs over 60.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Coal Per Ton.	5 No. Street Arcs.	6 Price per Year.	7 Price per 100 Hrs.	8 Total Arcs.	9 Total Incandescents.	10 Remarks.
Binghampton, N.Y.	45,000	4,000	$1.85	310	$ 98.50	$2.46	575	10,000	
Buffalo, N.Y.	375,000	"	2.00	2,500	100.00	2.50	3,800	40,000	
Paterson, N.J.	100,000	"	2.25	645	130.00	3.25	900	17,750	
Newark, N.J.	181,830[1]	"	1.70	1,565	98.55	2.46	2,250	11,500	
Germantown, Pa.	70,000	"	1.85	219	135.00	3.37	. .	. .	
Harrisburg, Pa.	55,000	"	1.67	374	85.00	2.12	1,000	12,400	
Lebanon, Pa.	18,000	"	1.95	80	104.00	2.60	155	25,000	
Lockhaven, Pa.	7,500	"	1.60	70	73.00	1.82	140	4,000	
York, Pa.	20,793[1]	"	1.95	217	82.12	2.05	286	8,000	
Cincinnati, O.	350,000	"	2.00	1,510	84.90	2.12	2,500	10,000	
Findlay, O.	20,000	"	1.78	179	69.50	1.74	290	4,000	
Galion, O.	9,200	3,680	1.76	92	72.00	1.95	128	1,000	
Lancaster, O.	8,000	4,000	1.70	80	85.00	2.12	125	. .[2]	
Marion, O.	12,000	"	2.00	122	83.00	2.07	126	3,000	
Toledo, O.	125,000	"	2.00	700	90.00	2.25	. .	. .	
Saginaw, Mich.	50,000	"	2.00	157	95.00	2.37	104	2,200	
Superior, Wis.	30,000	"	2.20	231	146.00	3.65	. .	3,200	
Duluth, Minn.	60,000	"	2.00	496	109.50	2.74	700	3,200	
Memphis, Tenn.	100,000	"	1.75	250	85.00	2.12	527	35,000	
Mobile, Ala.	50,000	"	2.25	180	69.50	1.74	425	2,000	
Kansas City, Mo.	175,000	"	2.00	208	110.00	2.75	. .	2,000	
Springfield, Mo.	30,000	3,680	2.00	150	77.50	2.11	231	1,400	
Omaha, Neb.	140,000	4,000	1.90	222	114.50	2.86	580	25,000	
Averages	88,362	3,972	$1.92	459	$95.54	$2.40			

1. Census, 1890. 2. Not reported.

TABLE XXII. Public Plants. 1,200 c. p. Under 1,800 Hours.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Price of Coal.	5 No. Street Arcs.	6 Value of Physical Plant.	7 Operating Expenses per Street Arc.	8 Cost per Arc per Year, Interest and Depreciation 5% each.	9 Cost per 100 Hours.	10 Cost per 100 Hours, at 7½% Depreciation, and Taxes.	11 No. Private Arcs.	12 No. Private Incandescents.	13 Fiscal Year.	14 Remarks.
Reading, Mass. . .	4,717	1,497	$4.05[1]	125	$67,500	. .	$93.99	$6.27	. .	. .	2594	Jan. 30, '96-97	
Wakefield, Mass. .	8,304	1,382	3.00	144	. .	. .	89.55	6.05	. .	. .	2300	Jan. 1, '97-98	
Hillsdale, Mich. .	4,300	1,440	2.49	55	25,000	. .	55.35	3.85	. .	3	1713	Mar. 1, '97-98	
Averages	5,774	1,440	$3.18	108	. .	. .	$79.63	$5.39	. .	. .	2202		

1. This price not reported, but it is the average of forty-one Massachusetts Companies quoted in the Bulletin No. 4112 of the General Electric Company, elsewhere mentioned.

TABLE XXIII. Private Plants. 1,200 c. p. Under 1,800 Hours.

1 Place.	2 Population.	3 Hours per Year.	4 Coal per Ton.	5 No. Street Arcs.	6 Total No. of Arcs.	7 Total No. of Incandescents.	8 Charge per Year for Street Arcs.	9 Charge per 100 Hours for Street Arcs.	10 Remarks.
Amesbury, Mass.	10,000	1550	$3.65	67	79	1,050	$75.00	$4.84	
Beverly, Mass.	13,000	1500	3.25	90	121	1,536	90.00	6.00	
Danbury, Conn.	20,000	1550	3.45	117	119	900	80.07	5.17	
Monroe, Wis.	4,000	1220	2.70	60	60	1,200	72.00	5.90	
Racine, Wis.	28,000	1550	2.27	192	250	6,000	68.50[1]	4.42	
Averages	15,000	1474	$3.11	105	126	2,137	$77.11	$5.27	

1. Average charge. Some arcs are lighted for $58, and others for $79.

TABLE XXIV. Public Plants. 1,200 c. p. 1,800 to 3,000 Hours. Coal, $1.50 to $4.00. Over 60 Street Arcs.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Price of Coal per Ton.	5 No. of Arcs.	6 Value Physical Plant.	7 Operating Expenses per Street Arc.	8 Cost per Year per Street Arc with depreciation and interest 5% ea.	9 Cost per 100 Hrs. with depreciation 5%.	10 Cost per 100 Hrs. at 7½% Depreciation and Taxes.	11 No. Private Arcs.	12 No. Private Incandescents.	13 Fiscal Year.	14 Remarks.
Braintree, Mass. .	5,311	2654	$3.00	92	$60,458	. .	$ 82.11	$3.09	. .	. .	4,258	June 30, '96–7	
Chicopee, Mass. . .	16,420	2985	3.50	132	92,463	. .	104.97	3.62	$4.21	. .	3,259[6]	June 30, '97–8	
Danvers, Mass. . .	8,181	1800	4.05[1]	85	35,126	. .	74.05	4.11	. .	3	1,675	Jan. 31, '96–7	
Middleboro, Mass.,	6,689	2250	3.00	105	. .	. .	62.90[2]	2.80	. .	14	1,881	Jan. 1, '96–7	
S. Norwalk, Conn.,[3]	7,000	2156	2.77	100	22,764	$36.62	59.38	2.75	3.02	. .	. .	Oct. 13, '96–7	
Ft. Worth, Tex. .	35,000	2179	2.65	68	44,000	46.00	79.75	3.64	4.05	. .	. .	Mar. 21, '96–7	
Marshalltown, Ia.,	12,000	1825 [4]	1.29	98	16,000	15.31	31.64	1.73	1.91	. .	. .	Apr. 1, '97–8	w. w.
Averages.	12,943	2550	$2.89	97	$45,136[5]	. .	$ 70.69	3.11					

1. Price not reported, but assumed to be that of an average of 41 private plants in Massachusetts as given in Bulletin 4112 of the General Electric Company before mentioned.

2. Will be about $50 June 30, 1897–1898.

3. South Norwalk added a fine plant for commercial incandescent lighting, 1897–1898.

4. As reported to Professor Parsons in 1895.

5. Average of 6 plants.

6. On Nov. 1, 1897.

TABLE XXV. Private Plants. 1,200 c. p. 1,800 to 3,000 Hours. Over 40 Street Arcs. Coal, $1.25 to $4.00.

1 Place.	2 Estimated Present Population.	3 Hours per Year.	4 Coal per Ton.	5 No. Street Arcs.	6 Total No. Arcs.	7 Total Incandescents.	8 Charge per Year per Street Arc.	9 Charge per 100 Hours for Street Arcs.	10 Remarks.
Arlington, Mass.	6,515	2,400	$3.50	81	132	11,202	$90.00	$3.75	
Malden, "	29,708	2,179	3.55	105	134	23,138	90.00	4.13	
Newburyport, "	14,552	2,179	3.85	145	160	147	73.50	3.32	
Southbridge, "	8,250	2,179	4.00	60	92	1,030	76.35	3.50	
Waltham, "	20,876	2,190	4.00	130	170	5,281	83.95	3.83	
Dansville, N.Y.	5,000	2,179	3.00	43	50	1,600	63.00	2.88	
Tarrytown, "	4,000	2,112	3.25	80	80	5,000	75.00	2.98	
Asbury Park, N.J.	3,800	2,810	2.40	75	422	12,000	72.00	2.56	
Bridgeton, "	13,500	2,852	3.40	70	80	1,200	81.00	2.86	
Woodbury "	4,000	2,179	2.65	43	46	. .	85.00	3.90	
Troy, O.	6,000	2,179	2.25	72	108	1,500	90.00	4.12	
Bedford, Ind.	5,500	1,825	1.60	51	80	1,500	72.00	3.94	
Rochester, "	4,500	1,825	1.55	44	125	1,500	70.00	3.83	
Beardstown, Ill.	6,000	2,250	1.50	47	. .	1,200	64.80	2.88	
Watertown, Wis.	10,000	1,825	3.00	64	62	750	66.00	3.61	
Charleston, S.C.	64,000	2,179	2.65	113	190	4,000	100.00	4.58	
Averages	12,888	2,209	$2.88	76	121	$4,737 [1]	$78.29	$3.54	

1. Average of fifteen plants.

TABLE XXVI. Public Plants, 1,200 c. p. Over 3,000 Hours. Coal between $1.00 and $4.00.

1 Place.	2 Estimated Present Population.	3 No. of Hours.	4 Coal.	5 Street Arcs.	6 Value of Physical Plant.	7 Operating Expenses per Street Arc.	8 Cost per Year per Street Arc, with Interest and Depreciation 5% each.	9 Cost per 100 Hrs., with Depreciation 5%.	10 Cost per 100 Hrs., at 7½ % Depreciation, and Taxes.	11 No. Private Arcs.	12 No. Private Incandescents.	13 Fiscal Year.	14 Remarks.
Marblehead, Mass.	7,671	3,608	$4.05[1]	164	$81,017	. .	$71.32	$1.97	. .[3]	. .	2,918	June 30, '96-7	
Peabody, Mass. .	10,507	3,714	3.00	166	72.066	. .	74.59	2.01	. .[3]	5	3,500		
Jamestown, N.Y. .	2,300	4,000	1.60	283	72,000	$36.19	61.63	1.54	$1.67	. .	1,600	Apr. 11, '97-8	
Tarentum, Pa. . .	5,000	4,000	1.00	70	32,000	14.09	59.80	1.48	1.78	. .	1,400	Feb. 28, '97-8	
Danville, Va. . .	19,000	4,000	1.00[2]	125	19,145	27.00	42.32	1.06	1.15	15	30	1897	
Fremont, Neb. . .	9,000	3,600	3.00	72	22,000	48.65	79.21	2.20	2.41	13	2,000	Apr. 18, '96-7	
Averages . .	8,913	3,820	$2.28	147	$49,705	. .	$64.81	$1.71	$1.78	. .	1,908		

1. Not reported, but assumed to be same as average of forty-one private plants reported in Bulletin No. 4112 of the General Electric Company.

2. Water-power. Cost $10 per year per horse power, assumed to be equal to $1 per ton of coal.

3. Estimated for Marblehead and Peabody on the bases of the other four plants.

TABLE XXVII. Private Plants. 1,200 c. p. Over 3,000 Hours. Over 70 Street Arcs. Coal, $1.00 to $3.00.

1 Cities.	2 Estimated Present Population.	3 Hours per Year.	4 Coal per Ton.	5 Street Arcs.	6 Total Arcs.	7 Total Incandescents.	8 Charge per Year.	9 Charge per 100 Hours.	10 Remarks.
Amsterdam, N.Y.	20,000	4,000	$2.50	138	180	. .	$98.00	$2.45	
Hornellsville, N.Y.	13,000	"	2.25	84	200	4,000	100.00	2.50	
Newburg, N.Y.	25,000	"	2.25	137	325	13,000	64.00	1.60	
N. Tonawanda, N.Y.	9,000	"	2.00	163	280	1,400	90.00	2.25	
Elizabeth, N.J.	45,000	"	2.80	100	155	14,067	100.00	2.50	
Chester, Pa.	35.000	"	2.00	140	151	6,727	84.00	2.10	
Franklin, Pa.	8,000	3,650	1.25	91	136	3,400	55.55	1.52	
Chillicothe, O.	15,000	4,000	2.00	162	52	4,000	75.00	1.87	
Sault Ste Marie, Mich.	8,500	"	2.77	73	110	3,500	66.00	1.90	
Richmond, Va.	96,000	"	2.65	516	516[1]	. .[2]	58.40	1.46	
Montgomery, Ala.	30,000	"	2.50	158	245	6,500	87.00	2.17	
Averages	27,682	3,968	$2.27	160	214	6,288[3]	$79.81	$2.03	

1. At least, but no data as to number of commercial arcs.
2. No data as to number of commercial incandescents.
3. Average of 9 plants.

SOME TYPICAL PLANTS.

Elgin, prior to city ownership in 1890, was paying $8,000 for 33 arcs running until midnight, or $242.42 per arc; but in 1891 the city ran 77 arcs all night on the moonlight schedule, or over one-third more hours, for $4,800 for operating expenses, or $62.34 each, plus say 10 per cent of the amount then invested, $17,900, for interest and depreciation. This would make the total cost at that time from $84 to $90, or about one-third of what the city had been paying; while the cost in 1896, even with interest and depreciation, was only about $72.

Owing to a miners' strike, the cost of coal per arc light, which had been $8.80 in Elgin in 1896, was $17.84 for each of 181 arc lights in 1897. Yet the entire operating expenses per light only rose from $52.85 in 1896 to $55.49 in 1897, or 5 per cent; while the hours of lighting increased from 2,240 to 2,448, or 9 per cent. Of the total cost of the plant, $27,000, $17,000 was spent in 1889. Hence 5 per cent depreciation would reduce the nominal value of the plant per arc light from $149 to about $100, on which to compute fixed charges of 10 per cent to 12 per cent. The city has been so satisfied with its success that it has just installed an incandescent plant for parks and public buildings.

Bangor, Me., if it had charged itself 5 per cent depreciation every year since the construction of its plant in 1889, would have charged off $12,250; but it has not been obliged to pay anything for replacement of the plant until this year, when it is spending $4,800 in exchanging the old dynamos for new ones, and 156 arc lights of 2,000 c. p. for 231 new lights of 1,200 c. p. In 1888 this city was paying $150 each year for 24 arc lights, or $3,600, and for gas and oil lights $5,400, or a total of $9,000. Now the operating expenses of $6,000 plus interest and depreciation at 10 per cent on the value of the plant as computed by allowing 5 per cent on the value for depreciation, amount only to $8,275 a year, or $53 per arc light.

No allowance is made by *Little Rock*, Ark., for clerk-hire, water, or ground rent of station, since these were not increased by the lighting-plant. The writer does not have sufficient data to apportion these small expenses, but they would probably not materially change the comparison in the tables.

One of the city officials writes: "Formerly the city paid $12,000 annually for one-fifth as much lighted territory, and one-fortieth as much light." This is probably an exaggeration, but indicates the sense of satisfaction the people have in their public plants.

The *Topeka* plant is so often held up as a warning against public ownership — use being always made of the experience of the plant — that the following facts from a careful investigation by a recent student of the writer's, Mr. Henry M. Thomas, at the Kansas State Agricultural College, are here given.[1]

In the early stage of development of electrical science in 1887, Topeka made the natural mistake of selecting a poor type of plant, at a cost of about $53,000, after deducting a contractor's forfeit of about $2,500 for failure to comply with the conditions of the contract. The operating expenses for several years were about $6 a month. Fixed charges of 5 per cent interest, 5 per cent sinking-fund, and ¾ per cent allowance for lost taxes, raised the total cost to about $102 a year of 2,200 hours, coal being $2 a ton, and the candle-power 2,000. As the lowest bid received when the plant was built was $120 a year, and as the prevailing price even now in cities of equal size in that section of country is $100, Topeka was far from losing by her enterprise.

In May, 1896, the plant was entirely rebuilt with modern machinery at a cost of $13,772, making the total cost of the plant nearly $67,000; but the yearly allowance of 5 per cent depreciation

[1] A much fuller presentation of his data will be found in the Report for 1898 of the Kansas Bureau of Labor Statistics.

from Dec. 1, 1887, until the renewal of the plant, June 1, 1896, amounted to $18,765. Evidently $3\frac{3}{4}$ per cent would have taken care of the depreciation due to use. But in order to reduce the value of the plant, June 1, 1898, to what it would cost to duplicate as a merely physical plant — about $45,000, according to the estimates of the capable superintendent and of an outside electrical engineer — 5 per cent allowance for depreciation is necessary. This would reduce the value of the plant in 1898 to $43,327. Money will soon have to be spent for extensions to keep up with the growth of the city.

The operating expenses in 1896–1897 were $40.68 per arc, and in 1897–1898 were $41.48, owing to extensive repairs on the boilers. Fixed charges would bring up the total cost to $61.48, or much less than in cities of similar size with private ownership in any part of the country, allowance being made for difference in the price of coal, hours operated, etc.

In the words of Mr. Thomas (1st Lieutenant, Company Twenty-Second Kansas Volunteers), —

"The standing charge that political influence and jobbery does and will destroy the efficiency of every city-owned enterprise, does not seem to be substantiated by the record of this plant. Although the tenure of employment of the less skilled workers is perhaps largely regulated by political considerations, yet the engineer and the chief

linesman and trimmer, who is reputed to be especially expert, as well as the superintendent, have each had steady and permanent employment for a number of years, even through different political administrations in the city. In fact, the present superintendent, who is a Republican, was appointed by a mayor who was a Democrat. It is true, however, that the absence of attempts on the part of political workers to secure the position of superintendent might be accounted for by the fact that his salary is so extremely low, $1,000 per year, as to offer few inducements for their efforts.

"The plant, as conducted at present, is a credit to the municipality, and is the pride of the citizens. Thorough and extensive efforts to find some complaints or evidence of dissatisfaction with the plant were entirely futile. The citizens are a unit in their expression of satisfaction with city ownership under a management as efficient as the present one."

The mayor of *Fairfield*, Ia., writes that this, the oldest city electric-light plant in this country, and probably in the world, originally cost $6,000. It was built by a private company in 1880, and was purchased by the city in 1882. No commercial lighting is done. There are six arc lights on a tower, and twelve others which are operated in connection with the city water-works; but the cost is kept separate. For light all night on dark nights, with coal at about $2 a ton, these few lights have cost the city on the average only $64 yearly per lamp, including the average expense of all renewals, but not, of course, the fixed charges.

An allowance of 6 per cent interest would only add $20 a light. The plant, says the mayor, has proven "very satisfactory" to the people.

The universally admitted success of public ownership in *Allegheny*, Pa., is largely due to the choice of an admirable chief, Mr. D. Hunter, who is appointed Superintendent of the Bureau of Public Lighting by the Director of Public Works, without the necessity of approval by the Council; and is given similar discretion over the appointment of subordinates, untrammeled by the spoils system.

The total output in 1897–1898 at Allegheny was 2,959,072 kilowatts, of which 23.3 per cent was used in running 5,373 incandescent lights in various public buildings. The operating expense per thousand watts has been gradually falling. It was 2.73 cents in 1895–1896, 2.44 cents in 1896–1897, and 2.41 cents in 1897–1898; or, put in another way, the average operating expenses per year have fallen from $61.24 in 1895–1896 to $49.56 in 1897–1898. In the latter year the charge, with interest and depreciation at five per cent each, was only $71.78 at Allegheny, and about the same at Wheeling. In the table the expenses of the arc lights only are given at Allegheny. The operating expenses of the incandescent lights 1897–1898 were 2.59 cents per kilowatt. The 1,146 arc lights in use in March, 1898, had cost $267,302.26, or $233.34 each. The incandescents,

equivalent to 5,373 of 16 c. p. each, had cost $91,600.24, or $17.05 each. If account be taken, however, of only the actual number of incandescents, 5,196, some of which are of higher candle-power than 16, the cost would be about $17.63 per incandescent light. About $100,000 was obtained for extensions of the plant in 1895–1896, by selling 4 per cent bonds at a premium of 106, so that the allowance in the tables of 5 per cent interest is too high in this plant, as of course in many others in large cities where bonds are readily sold at par at 4 per cent and sometimes at 3½ per cent.

Prior to the construction of the Allegheny plant in 1890, the city had been paying $180 each for 15 to 18 arc lights from a private company; but of course for a large contract with the cheapened costs of recent years, even under private ownership this charge would have been greatly reduced. Yet Pittsburg, Pa., across the river from Allegheny, was paying $195 a year per arc light as late as 1895, and has been paying $96 since then.

Detroit, Mich., paid $130.38 per light in 1892 to a private company for 1,168 arc lights; $128.87 in 1893; $132.41 in 1894 for 1,279 lights; and there was little prospect of reduction unless a ten years' contract was given, in which case a bid for $102.20 was made in 1893. The cost in 1897–1898, under public ownership, including interest

paid on the lighting-bonds of 4 per cent, the taxes of $2.02 per lamp paid by the late contractors, and depreciation of 5 per cent on the value of the plant as it was in June, 1897, after deducting the depreciation of the previous year, was under $85. The public report for 1897–1898 gives the operating expenses as $51.85, and the fixed charges as 31.65. To be sure, this report computes depreciation at only 3 per cent, but, on the other hand, estimates it upon the original cost of the plant of about $390 per arc, instead of upon the true value of about $350 per arc, as it must have been at the beginning of the fiscal year, after deducting previous depreciation.

The report also estimates the taxes that a private company would put at $4.35 per lamp, although the late contractors paid only $2.02.

Interest, also, is computed at 4 per cent in the report; although $600,000 of 4 per cent bonds were sold for building the plant for $627,540, making the real interest only 3.84 per cent.

The report is very misleading, also, in its statement that a contract could probably now be made with a private company for light at $90 a year; since this ignores the fact that the city could not have delayed making a contract until now without paying from $120 to $135 per year, and could not get a $90 contract now, probably, without giving it for five or ten years, during which time the

cost of public lighting will almost certainly fall materially. Operating expenses, in fact, have already fallen from 3.979 cents per 1,000 watts, Jan. 1 to June 30, 1896, to 3.038 cents June 30, 1897–1898. Put in another way, the yearly operating expenses per arc light fell from $64.19 during 1896–1897 to $51.85 the following year.

It may be noted that the expenses of the Detroit plant include a premium for insurance on the boilers and for damage to person or property that may be caused by an explosion. During 1895–1896, and possibly since then, the operating expenses included the full pay of four men, employees of the city, partially or totally disabled by accident, together with the medical and surgical attendance they required. These items were covered in the report under the head of labor and management.

Equally vital to a proper understanding of the famous Detroit company is a knowledge of why the cost of construction was so great. In order that Detroit might be equipped with conduits of sufficient size to include all kinds of wires, and to secure other advantages not directly connected with lighting, the cost of construction up to July 1, 1895, attained the high figure of $64,845.84 for incandescent lights for public buildings, or $19.03 per light, and $706,451.89 for street arcs, or $390 per arc. This does not include the cost of about

40 arcs and about 500 incandescent lights in an island park opposite the city.

While not criticising the cost of construction, Mr. Dow, the first superintendent of the plant, has given the writer figures showing how a different location of the plant and less expense for conduits would have enabled a plant equally efficient for purely lighting-purposes to have been constructed for $91,470.95 less. This would leave the necessary cost of construction about $345 per arc, and about $17 per incandescent light. This seems reasonable from another point of view. The last report of the plant shows $76,144.32 invested in conduits, or $43.66 per arc. Of this only one-fourth is used by the electric-light plant. One-half of the poles also (see Report, page 8) are used by the police and fire departments, and by private commercial lighting, telephone, and street-railway companies. It would not be surprising if a close investigation should reveal the fact, that, had not the Detroit public lighting-plant been built with a view (wisely, no doubt) to these other public purposes, the cost of construction per arc light would have been under $300.

If space permitted, it would be very interesting to describe the efforts of private electric plants, not only in Detroit but elsewhere, to prevent that city from securing even a street-lighting plant in 1894. Only the persistence of the then mayor of

Detroit, Hon. H. S. Pingree, secured the present plant, by which, as we have seen, the average price of street-lighting has been reduced one-sixth, and by which an even greater reduction could occur in private lighting, if the plant were allowed to enter that field.

The advantages of public ownership in a well-managed plant, even when there is no apparent reduction in price after all allowance is made for depreciation, interest, etc., were admirably expressed by Mr. Dow in the *Western Electrician* (Feb. 22, 1896), as follows: —

"To sum it up: If a municipal plant is operated and managed in good running order, at such a figure as, added to interest, sinking-fund, and lost taxes, will equal the contract cost of lighting, there is a gain to the taxpayers in municipal lighting, *directly by reason of ownership of a marketable asset, free from incumbrance at the winding up of the sinking-fund; and indirectly by the retention of the depreciation fund in the active business of the taxpayers.*"

The italics are ours. In other words, Detroit may, from a bookkeeping point of view, compute the cost of her lights as about $85 a year, in comparison with about $130 under private ownership, or $102.20 promised on a ten-year contract; while, looking forward to a time 20 or 30 years hence, when the plant will be entirely paid for from a 5 per cent yearly depreciation fund, so that interest and depreciation will no longer have to be reck-

oned. The city may also consider the cost not as $85 a year, but as say $65 a year, or whatever the running-expenses and interest may be, and $20 more, which may be kept in the pockets of the taxpayers until needed for expensive renewals 10 or 20 years hence.

Hamilton, O., had succeeded admirably with her city gas-works since 1890, and constructed an electric-light plant in 1895, but instead of placing it under the control of a board of three commissioners specially elected for the purpose, left it in charge of the city council, by whom it seems to have been inefficiently managed for a while; but detailed information was not sufficiently preserved by those in charge to permit any full examination of the matter. Feb. 1, 1897, however, the plant was placed in charge of Mr. W. N. Gray, who appears to have been an excellent electrician and business manager. The total operating expenses per kilowatt in 1897 were only 3.41 cents; and an allowance of 10 per cent for interest and depreciation would add 2¼ cents more, or a total of about 5¾ cents. Since many consumers in Hamilton secure discounts by using large amounts, or because they pay by the month instead of by meter, the average charge is only 6 cents per thousand watts. This may well be contrasted with the common charge of 10 to 15 cents by private companies in cities of this size. Small consumers in this city paid 8

cents per thousand watts. The Hamilton plant nearly doubled its receipts from commercial lighting in 1897, and showed in every way some of the best financial results in the country. Unfortunately, however, the city belongs to that pitiable class which seems fortunately to include less than one-third of the seventy-four public plants quoted in these tables, which allows "politics" to handicap the success of public management. A change of city government in the spring of 1898 has been followed by the resignation of the capable superintendent, and by poor management that must be checked soon if the success of the plant in 1897 is to continue.

Jacksonville, Fla., is one of the most conspicuous examples of success in municipal ownership. Not only is the net cost of its 122 public arc lights reduced by good management and by the receipt from commercial lighting to less than one-fourth of what the city had been paying a private company, but the commercial rates of the public plant have been reduced one-half, forcing a considerable reduction in the prices of two private electric-light plants in the city, and of gas. These reductions alone are officially estimated to equal a yearly profit to the consumers of light of two-thirds the cost of the public plant.

For many years the *Chicago* electric-light plant partook of the inefficiency characteristic of much

of the work done by the city council of that city. It has been customary among private electricians to consider this plant a grand illustration of municipal failure, as bad in its way as the Philadelphia gas-works; but a careful examination reveals a somewhat different situation, especially the past year. The plant was begun in 1887, and gradually increased until 1,321 street-lights were in operation in 1897. The usual running-expenses prior to the year last mentioned were reported as about $96 per light. The addition of a few omitted items, such as water, obtained free from the city mains, and some office expenses and repairs, would bring up this amount to somewhat over $100, according to the present able head of the department. In order to reduce the cost of construction and of extensions to that which the present superintendent considers the present cost of duplication of about $400,000, or about $300 a light, it is necessary to compute depreciation at 15 per cent a year prior to January 1893, and at 7½ per cent subsequently. This would mean a total cost, including interest at 4 per cent, of about $175 a year prior to 1894, and of about $135 a year from then until 1897. The city, however, was obliged to pay for the considerable number of arc lights rented from a private company $175 a year prior to 1893, and $137.50 that year. Up to that time, therefore, there was not much difference between

private and public ownership as regards price, unless it be true, as claimed by the city officials, that the price was reduced by private companies in order to compete with the city plant. For this or other reasons the city was able to buy about 500 arc lights from private companies in 1898 for $107.50; although the Edison company charges $137.50 per arc light for 69 lights, and exacts from private consumers $108 a year for lights burning only until midnight.

Philadelphia in 1897 paid $109 to $146, or on the average about $126, Boston, $127.75, and New York, for lights of only 1,200 c. p., from $146 to $182.50, while coal was nearly as cheap in Philadelphia and New York as in Chicago. At least the difference in the price of coal did not justify $5 difference in the charge per arc light per year. These figures would seem to indicate that the reduced price of private lighting in Chicago may have been due to the competition of the public plant; but however that may be, the city plant seems to have been wastefully managed, and not equipped with the best machinery, as shown by a comparison of items of cost with those of the modern plants at Allegheny and Detroit.

For example, in 1896 the cost of labor in the Chicago plant was $51.43, in the Detroit plant $31.65, and in the Allegheny plant $32.77 per arc light. The cost of coal, likewise, which was

slightly under $2 a ton in Chicago, and $2.22 in Detroit, was about $25 per arc light in the former city, and only $9.29 in the latter. The difference was no doubt due in part to the location of the Chicago plants, which required the hauling of coal by wagon, and to the fact that three moderate-sized plants, considerably out of date, were used in Chicago to do the work done by one large and thoroughly modern plant in Allegheny and Detroit. Although there is no proof at hand, it is quite likely, also, that the spoils system handicapped the Chicago plant more than it did the others.

With the inauguration of civil-service reform, and the appointment of a new electrician, Mr. Edward B. Ellicott, in the summer of 1897, a remarkable change has taken place. During the first six months of 1897 the average operating expenses of 1,260 arc lights of 2,000 c. p., burning 1,904 hours, were $46.73, or 2.45 cents per hour. During the first six months of 1898 the average operating expenses for 1,460 arc lights, burning 1,960 hours, were $35.91, or 1.83 cents per hour, a reduction of one-fourth. This means that the operating expenses for 1898 will be about $70, and the chief estimates that in 1899 improvements and extensions will reduce this cost to $60. Interest and depreciation will only raise the total cost to about $90.

The Chicago city plant has in operation in the fall of 1898, 2,500 arc lights, and is to add 500 more during the winter. The largest and most recently equipped part of the Chicago plant, centering at Halsted Street, had operating expenses of only $32.38 during the first half of 1898, when it was not running up to its full capacity, as it will soon do. Chicago no longer needs to apologize for her city lighting-plant, and may yet be able to rival Detroit, Allegheny, South Norwalk, Conn., and other conspicuous illustrations of municipal success.

The great Chicago Edison Company sold 18,238,000 kilowatts in its fiscal year 1897–1898 for $1,661,863. This would mean 9.112 cents per kilowatt, or about $175 for the same number of kilowatts as are yearly burned in a single Chicago street-lamp.

It may be claimed that it costs more to distribute a thousand watts through incandescent lights than through arc lights; but since the present cost of producing a thousand watts for street lights, including even interest and depreciation, is under 5 cents per 1,000 watts, and inasmuch as the fixed charges for conduits, land, etc., would not have to be proportionately increased with the assumption by city plants of commercial lighting, there is good reason to accept as not a very great exaggeration the positive statement to the writer of the previ-

ous chief of the Chicago city plants, Mr. Barrett, that if Chicago were allowed by State law to sell electric light to private consumers the charge now exacted from them could be cut in two.

COST OF CONSTRUCTION PER ARC.

In Table XXVIII. is given the present estimated value or cost of duplication per arc light in 29 public plants that have no commercial lights. These costs are in most cases the costs of construction, less 5 per cent annual depreciation. In a few cases — such as Chicago — a higher rate of depreciation in the earlier years of the plant was found necessary, as already explained, in order to reach the present value of the physical plant as estimated by the superintendents. The average present value per arc in these plants, which average 283 arcs each, is only $195.05. Valuable data upon the cost of construction of lighting-plants will be found in Buckley's "Electric Lighting," and in Professor Parsons's article in the *Arena*, September, 1895.

TABLE XXVIII. Cost of Construction.

PLACE.	COST PER ARC.	NUMBER OF ARCS.
Elgin, Ill.	$192.30	156
Bay City, Mich.	122.00	209
Little Rock, Ark.	100.00	212
Easton, Pa.	154.20	141
Batavia, N.Y.	250.30	103
Dunkirk, N.Y.	264.10	75
Meadville, Pa.	183.50	109

Place.	Cost per Arc.	Number of Arcs.
Bowling Green, Ky.	$140.00	72
Bloomington, Ill.	270.40	307
Frederick, Md.	230.03	76
Newark, O.	177.00	226
Wheeling, W. Va.	231.60	468
Aurora, Ill.	161.50	206
Chicago, Ill.	301.82	1,321
Detroit, Mich.	338.00	1,564
South Park, Chicago	289.60	490
Allegheny, Pa.	223.20	1,146
Carthage, O.	333.30	45
Paducah, Ky.	141.70	120
Decatur, Ill.	158.40	156
Columbus, Ind.	134.20	82
Morgan Park, Ill.	100.00	40
St. Joseph, Mo.	113.10	355
Marion, Ind.	203.40	118
Painesville, O.	147.10	85
Sherman, Tex.	200.00	64
Titusville, Pa.	126.60	114
St. Charles, Mo.	187.50	80
Topeka, Kan.	187.50	264
Averages	$195.05	283

In the 12 public plants of 2,000 c. p., and mostly of large size, that report the cost of coal per arc light as well as per ton, the average cost was $2.05 per ton, and $12.43 per arc light, as shown in Table XXIX. The average number of hours burned by these lights was 3,029. This would indicate that a difference of one dollar per ton in the cost of coal would make a difference of $6.06 per arc light. With smaller plants, using smaller boilers and engines, the difference is likely to be nearer $10.

TABLE XXIX.

PLACE.	COAL PER TON.	COAL PER ARC.	NO. OF HOURS BURNED.
Elgin, Ill.	$1.93	$8.80	2,240
Wheeling, W. Va. (about)	.85	6.48	4,000
Aurora, Ill.	1.75	7.49	2,527
Chicago, Ill.	4.25	27.12	4,066
Detroit, Mich.	2.22	9.29	3,791
South Park, Chicago	3.39[1]	16.00	2,133
Allegheny, Pa.	.90	10.96	4,105
Topeka, Kan.	2.00	12.10	2,195
Bay City, Mich.	1.75	10.98	2,623
Little Rock, Ark. ($1.90 to $3.20), say	2.25	11.20	2,453
Batavia, N.Y.	1.92	12.63	3,407
Dunkirk, N.Y.	1.45[2]	16.08	2,809
Averages	$2.05	$12.43	3,029

THE SPRINGFIELD, ILL., EXPERIMENT.

Those cities which are unable to secure suitable legislation for city ownership, or which are not otherwise prepared for such an undertaking, can obtain much encouragement from the example of Springfield, Ill., in case as much public spirit can be found among prominent citizens as was developed there.

In 1894 that city was paying $137 per annum for arc lights of 2,000 c. p., that were burning on moonlight schedule; i.e., during dark nights. This company controlled the gas company, and refused to offer lights for less than $120 in order to secure

[1] Oil equivalent to that price for coal.
[2] Oil was used computed as equivalent to coal at $1.45.

another contract. The company, in fact, presented a signed statement with some specifications, showing that the cost of the service was $117. The City Council looked into the question, but found that it was handicapped by the Constitution of the State, which limits indebtedness, Springfield having reached this maximum limit. The legislature had not then given, and has not now given, permission to Illinois cities to sell electric light to private consumers. Whereupon sixty citizens organized a company, specified the necessary stock, required a franchise from the city, and proposed to administer the affairs of the company without pay. The old company had furnished 147 arc lights of 2,000 c. p., aggregating 294,000 candles, 232 incandescent lights of 20 c. p., aggregating 4,640 candles, and 402 gas lights of nominal 18 candles, aggregating 7,236 candles, or a total of 305,876 candles, for $24,000. The new company, the Capital Electric Light Company, offered for the same money, $24,000, to furnish 300 arc lights of 2,000 c. p., aggregating 600,000 candles, or 98 per cent more light. This would be $113.33 per arc light. The company also agreed to light the city hall, police headquarters, and engine-houses free of charge, a service which now requires over 800 incandescent lights, though the city makes no charge for water.

Of this $113.33 per arc light received from the

city each year, $53.33 was to be applied in paying for the plant. As soon as paid for, this was to become the property of the city without any payment, thus reducing the cost to at least $60. The old company thereupon offered to do the work for $90 per arc; although it had previously insisted that the cost was $117, and in 1897 sought in vain a contract from the city at $68. After considerable litigation, brought on by enemies of the enterprise, this Capital Electric Light Company began operations. No contract with the city was made, because a contract for the five or more years necessary to pay for the plant could not be legally effected; but it was agreed that so long as the city paid $113.33 per light per annum, all profits arising from the administration of the company's affairs should be applied in the liquidation of the company's indebtedness; and when the profits equaled the cost of the plant the city might take it, but the city would forfeit all its rights whenever it ceased to use the company's lights. Thereupon the 60 citizens subscribed $1,000 each, and placed the stock subscriptions in the hands of a treasurer to be held as collateral security for moneys borrowed from the banks of the city for constructing the plant. As these citizens were too actively engaged in their own business enterprises to manage the plant, they made a contract at the start with two practical electricians to furnish arc lights

at $60 per light per annum, this to include 7 per cent interest on the cost of the plant. The banks had charged 7 per cent for their loans to the company. For the lighting of the city buildings the lessees are paid by the stockholders 6 cents per watt hour. This amounts to about $1,800 a year of free gift to the city.

The lessees are not tired of their contract; although after paying 7 per cent interest, they have only about $43 per arc left for operating expenses, and the plant runs between 2,800 and 3,000 hours per year.

The Capital Electric Company turns over to the lessees 75 per cent of the commercial lighting receipts, using as much as is necessary of the balance to pay for the cost of collecting. Any surplus over this 25 per cent of commercial receipts applies to the extinction of the debt. Commercial charges are 40 per cent less in Springfield than when the new company started in June, 1895. The Hotel Nicholas had been paying $2,800 a year for gas. It was lighted with electricity from the new company for $1,200. As it now has a plant of its own for heating, elevators, baths, etc., the hotel makes its own electric light for still less cost.

The plant has been largely extended. It furnishes 38 arc lights, paid for by the railroads at the street crossings, and a growing number of private lights. The total cost of the plant up to

June 1, 1898, was $111,130.40, of which $87,-085.56 was for the municipal lighting. The company had credited the city with profits of $60,-195.65, leaving a net debt of $50,934.75, which will be entirely canceled in two or three years, according to the amount of further extensions that may be constructed meantime.

In 1900 or 1901 the city will come into possession, free of debt, of a plant that will not only manufacture arc light for about $40 a year per arc, but which, even at the present greatly reduced rates for commercial lighting, will receive enough therefrom to cover all the expense of street-lighting.

The only doubtful question is whether the hitherto successful resistance of electric-light companies to the passage of a law permitting municipal commercial lighting will be overcome, so as to permit the city really to enter upon its inheritance.

APPENDIX.

Validity of Electric Light Comparison.

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Whenever the study of a problem in mathematics, natural science, or economics leads investigators to many different and contradictory conclusions, we must not only search in the data used in order to obtain an explanation of the varying conclusions, but also must learn whether there is agreement in the fundamental principles applied to the solution. No collection of accurate data can lead to an accurate solution of any problem, if the data are obtained in such a manner as not to cover all the points at issue. Under such circumstances, contradictory conclusions are found, not, as is often thought, on account of the mental attitude of the investigators, but rather from a lack of consideration of the principles involved in the solution.

No problem in economics has yielded more discordant solutions than has the problem of the comparative value of municipal and private ownership in electrical undertakings. Attempts have been made to explain these discordant solutions by reference to the comparative fullness of data used by the different investigators, but instances are not infrequent of opposite conclusions from a consideration of the same statistics. In order to explain this, therefore, we should attempt to ascertain the basis of comparison used by

the various writers, and if possible determine wherein their positions lack fundamentality of character. We should endeavor to point out the line of study leading to a true result, and reduce the question to a scientific standard, with the hope that such reduction will enable us to apply the statistics we may obtain from many individual cases, so that the truth of any conclusions will appeal to all who are capable of reasoning upon scientific facts.

One fundamental principle or method has been applied by all who have studied this problem of municipal ownership of electrical plants. This fundamental method rests upon a comparison of the cost for illumination to a municipality by a municipal plant, with the charges made for a similar service by a private corporation. These questions of cost and charges have sometimes been based upon the yearly expense of the entire lighting service, sometimes upon the annual charge for a single lamp, sometimes upon a daily rate, and recently a comparison has been made between the cost per candle-power hour in the different systems. It is therefore hardly to be expected that we would gain any new light upon the problem by any further subdivision or multiplication of statistics involving the expense to a municipality; and since this question of expense has been interpreted from the same statistics with such widely different results, we must look further than the basis of the tax-rate for concordant conclusions. That this question of the simple tax-rate for street illumination is an insufficient means of comparison may be at once shown from the most casual investigation of the conditions under which municipal plants and private corporations are furnishing electrical supply. The sale of current to a municipality rarely includes more than a quarter of the entire business of a private electrical corporation; and in consequence the interests of the inhabitants of the municipality are not represented

simply by the expense to the municipality for current used in illuminating its streets and public buildings, for the inhabitants are equally concerned with the charges that will be made for the supply of current which they individually consume. Should a rate for public lighting be made by a private corporation, involving a financial loss upon the service, such a rate cannot be justly used in comparing the expense with that of a municipal plant for the same public service, since the amount of loss, as well as profit, upon the entire undertaking must be covered by the charges to the taxpayers for furnishing their individual supply. On the other hand, the low running-expenses of a municipal plant may not always be a source of profit to the municipality, if the existence of a municipal plant will deprive a private corporation of a profitable portion of its business, and entail an expensive system of operation, necessitating excessive charges to individual consumers. Laying aside, for the present, these reasons for inconclusive results in comparative studies of public corporations for the supply of electric current, we should consider the economic principles involved in such a supply, considering it simply as a municipal undertaking, whether the plant is actually owned by the municipality or by a private corporation.

In such undertakings the community is concerned with the economy of manufacturing rather than with charges made for the service. Applying to such a case the old principle that "a man may be considered a public benefactor who makes two blades of grass grow where one grew before," we find that we may consider every undertaking from a basis of economy in both labor and materials. *A service is properly performed for the benefit of the entire community when the minimum amount of energy is employed in preparing for the service and executing it.* The true basis of comparison and the true conclusion in studying the prob-

lem of electrical supply is not therefore to be found in the cost to the municipality for a certain portion of that service, but rather in the expenditure of human energy for performing the whole service. That electrical plant is of the greatest service to the whole community which supplies a given amount of electrical energy with the smallest amount of plant, the lowest consumption of coal, water, and supplies of every kind, and in which the simplest management can be obtained and the smallest number of men employed for the least time in the management, in keeping accounts, in operating machinery, and in performing repairs.

So stated, the problem becomes one of the science of engineering, rather than of the science of economics; since from the science of economics the engineer derives his instructions, but from that science he can obtain no aid in carrying out the undertaking in a manner which will conform with these instructions. Furthermore, we should point out that the comparison so outlined cannot be made upon the limited basis of any unit of electrical energy. To compare a private corporation within the limits of a great city, where an immense supply is furnished, and where special conditions of non-interference with adjoining property rights are to be met, with some municipal plant in a suburban town upon a basis of the relative amount of supplies and labor required per unit of electrical energy, would obviously be unfair to both contestants. Nor is it possible to compare in this manner two lighting-stations having approximately the same yearly output, and which are similarly located with reference to adjoining interests, but are situated the one in the North and the other in the South, for the reason that the daily period of service will vary in these two localities on account of variation in the hours of darkness. For the same reason we cannot compare the

summer service of one station with the winter service of another, even though we should attempt to reduce them both to a common basis by obtaining the amount of human effort employed per unit of electrical energy. Comparisons should be between similar plants, or between those similarly situated. We may not draw a parallel between municipal and private central stations where simply the same number of engines, of boilers, of dynamos, and the same length of line is used, or where the same number of lights are supplied with current, until we know more completely the conditions of time under which the machinery is run and the energy is furnished.

All of these conditions which we have laid down for a systematic comparison of electric plants point to a comparison *of the amounts of supplies and the sum of labor employed in furnishing electrical energy in two similarly situated stations where the load curve is of similar form and area.* This load curve, upon which so much stress is thus laid in the comparison of different stations, is a curve showing the output of any station at each interval of time during a day, a series of which will represent the output of the station through a year. By a study of the characteristics of such a series of curves, we may determine the equipment and machinery which are best adapted for a station, and at the same time we may tell, with a reasonable approximation to truth, the amount of supplies and of labor that should be required in operating. We find that the shape of such a curve depends not only upon the character of the supply, whether of arc or incandescent lights or of motors, but also upon its shape as determined by the seasons, and that for any one time of year those stations upon the same parallel of latitude are the only ones in which the curve is of similar form.

As regards the shape of the curve, we may consider as

typical of a municipal arc-lighting supply-plant one which shows the same amount of energy furnished at all instants for a considerable period of time. The only variation in the amount of energy is that which occurs when a large number of lights are lighted or extinguished together. In the general form for large stations we find that the lighting all begins at the hour of sunset. The maximum load is carried until nine o'clock, when a portion of the lights is extinguished, a second portion being extinguished at eleven o'clock, the remainder running until sunrise.

A typical motor load is represented by a curve running at the same level from seven o'clock, the time of opening workshops, until noon, and at the same level from the hour after dinner until the time of shutting down in the evening.

The typical load for an incandescent station gives no such simple curve, since the time of operation for individual lights depends upon the will of the user, and not upon anything which may be controlled from the station, though a comparison of the different load curves shows that the time of use is very largely determined by natural laws, and that the incandescent light curve of different stations at the same latitude is generally similar in form. During the winter, in cities at about the 40th parallel of latitude, the typical load curve beginning in the early morning shows a lighting load of about 2 per cent of the maximum, which value remains constant until five and six in the morning, when workingmen are taking their breakfasts; then a short rise to perhaps 10 per cent extends until about seven o'clock, when the curve falls to $1\frac{1}{2}$ per cent of its maximum, which continues until three o'clock in the afternoon. Then a rapid rise begins, and extends to the maximum load of the day, from six to eight o'clock in the evening. This value is held for not longer than two hours, when the load falls until it reaches the value given for the very early morning.

In a station supplying current for all three of these services, the curves are obviously superimposed and the maximum rises accordingly. This maximum determines the capacity of the station, while its comparison with the total output of the station gives the quantity that has been named the *Load Factor*. This is the relation of the possible station output to the actual output. To any one who will consider the subject of the amount of material and labor used in any central station, it will be at once apparent that this quantity depends as much upon the maximum load and the load factor as upon the actual output. These two quantities, the load factor and the load curve, give the basis upon which different electrical stations may be compared systematically.

The maximum value of the load curve determines, as we have already said, the maximum capacity of the station. Its shape should determine the choice of the proper sized units for supplying this load, while finally the load factor will give approximately the best economy under which such a station could be operated.

To compare municipal with private electric lighting stations, we should, therefore, endeavor to determine under which management the best engineering in the design of the station may be expected, and under which management the most economical station operation can be obtained. The answer to these questions is the solution to the economic problem without regard to the delusive quantity of the tax-rate.

In order to illustrate more clearly the principles we wish to apply in the study of the problem, a few applications to definite cases will undoubtedly present the subject in a better manner than can be done in any statement of the principles. Accordingly a number of curves are here presented, which are taken from similar studies of definite

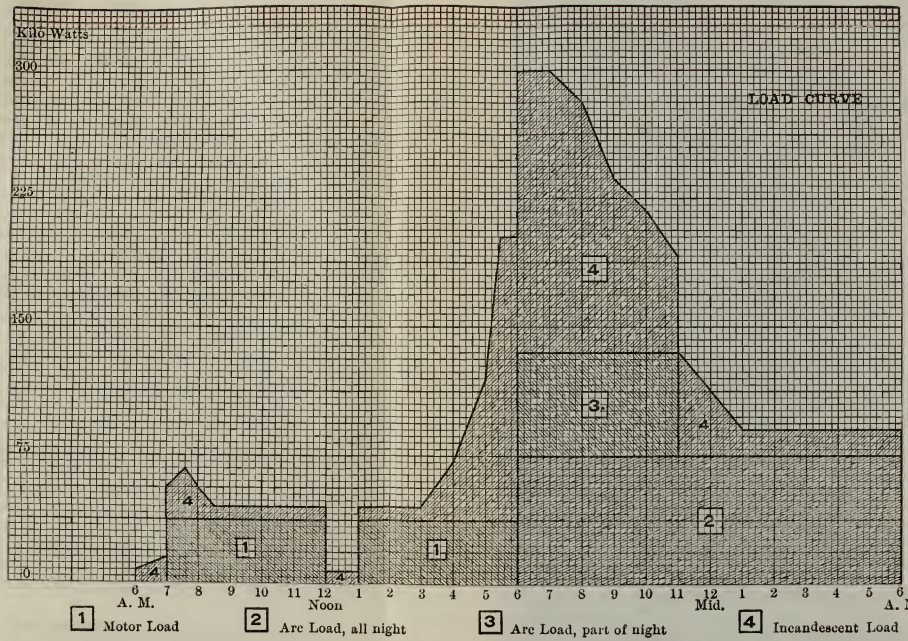

Diagram A. Output (Load Curve) at Different Hours.

electrical undertakings. Diagram A represents an approximate average autumn load curve of a small station operating 189 "all-night" arc lamps, 120 "11-o'clock" arc lights, about 2,220 incandescent lamps of 16 c. p., and 50 h. p. in motors. We see at once that the day load consists of a motor load (marked 1) and a light incandescent load (marked 4), while the arc load is represented by the sections marked 2 and 3. The distinctive character of these various loads to which we have called attention is clearly brought out in this diagram; and it is seen that while the motor and arc lighting loads are constant in value, the incandescent load rises very sharply from the small amount required in the daytime to the maximum required during the dinner-hour in the evening. These load characteristics vary with different stations, as we have stated, and particularly with changes in the latitude; while the expense of operating the station is a function, not of the maximum load which determines the capacity of the station, but of the shape of this load curve, and the value of the load factor.

In an article in the June, 1897, number of *Electrical Engineering*,[1] Mr. E. A. Merrill has shown that in such a station, where a plant is equipped with four engines of 800 h. p. each and operates for two hours at full load for the engines, three hours at 81 per cent of full load, six hours at 75 per cent, ten hours at 50 per cent, and three hours at 56 per cent of full load, always considering the capacity of the engines in actual operation, or for an average of 65½ per cent, the average increase in coal consumption per indicated horse-power hour over the best results actually obtained in this station is as much as 12½ per cent. His figures can only be criticised as being too favorable to

[1] "The Total Efficiency of Certain Central Stations," E. A. Merrill. *Electrical Engineering*, vol. vii., No. 42, p. 371.

the economy of the station on account of the large load factor of 65½ per cent; whereas, generally, the load factor will fall below 40 per cent, and the percentage of increase in coal consumption above the best results will rise to 30 or 35 per cent. In addition to this one item of coal consumption, we must also consider the fact that the cost of management, repairs, and interest are not variables with the load, but are constant throughout the day and even through the year, though the load curve changes its shape and the load factor alters its value with each changing season.

It is unfair to compare a station operating only street-lights with that operating a mixed load, for street-lights are produced at a lower labor cost per unit of energy than a mixed load would allow. Should a municipality be enabled to reduce its tax-rates by the operation of its own lights, it would, in general, necessitate an increase in the rates charged for commercial lighting. To be sure, should the amount of power increase with the size of the municipality to such a degree as would require the installation of many generating plants, the force of this statement would be lost. The management of the different stations must be independent, and the conducting lines for different classes of supply must also be independent, whether the power be furnished by one company or many, — by the municipality alone or by the municipality in connection with a number of private corporations.

Turning again to the consideration of actual load curves, Diagram B represents the load-curve of a station and the corresponding amounts of human energy required in maintenance. The area between O — X and A represents the interest and taxes upon the entire plant; the area between A and B, the proportion due to management; between B and C the line maintenance; between C and D, station maintenance; between D and F, labor; while only the area

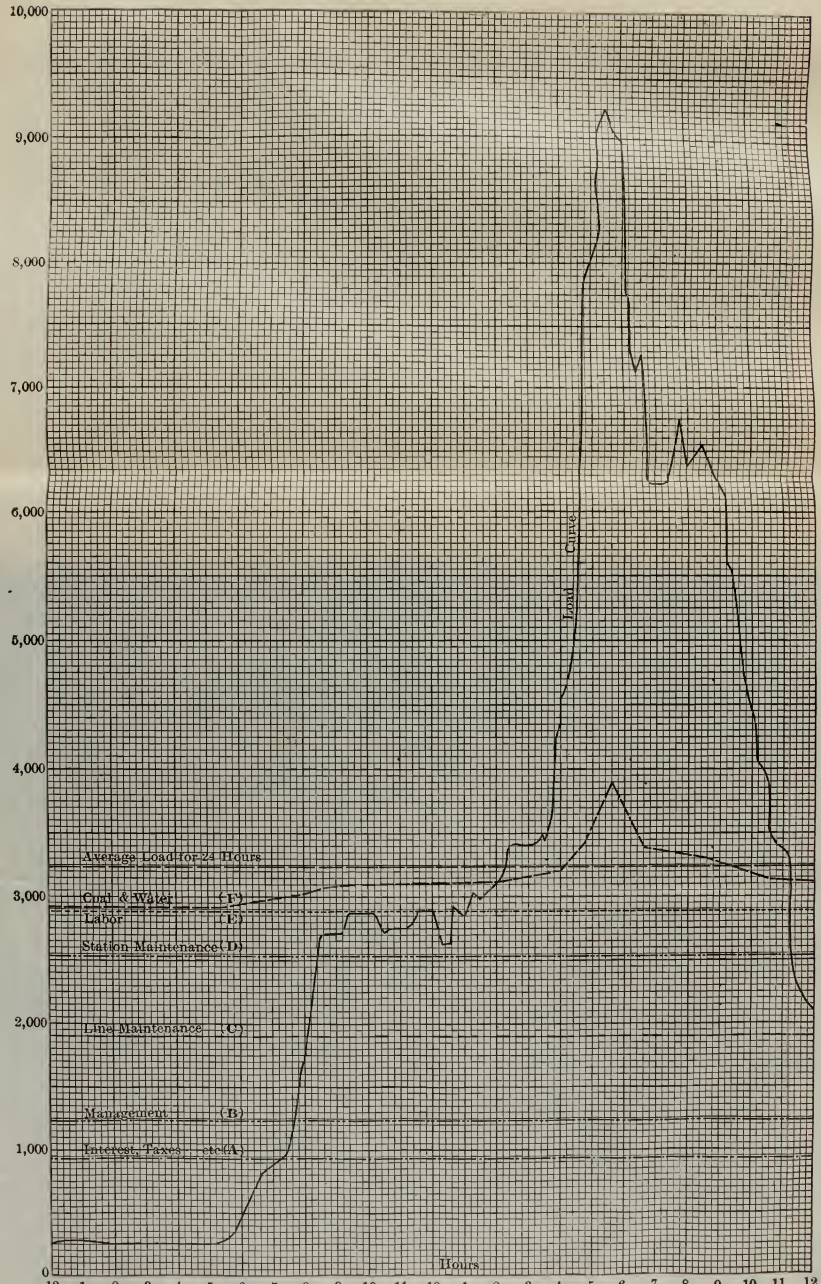

Diagram B. Expense for Different Amounts of Output.

between E and F represents the expenditure for coal and water, and is variable with the output represented by the load curve.

The skill developed in planning any central generating plant will in part depend upon the experience and ability of the engineer investigating the problem and designing the generating station. The likelihood of obtaining such engineering ability will vary with the interest of the managers in the result of the plant, and with the manner of their appointment. Political appointments, therefore, will not generally bring forth as much talent as will the appointment by business men whose fortunes are involved in the undertaking. On the other hand, the possibility of a correct design being systematically carried out is a function of the funds available and the disposition to construct enduring works. Considering this portion of the problem, we find that experience points to better work on the part of municipalities than on the part of individuals or corporations, for the reason that immediate returns are required of a corporation or commercial undertaking, rather than a supply involving the least possible ultimate labor cost.

As regards the problem of management, the political character of all municipal appointments must be considered in determining the question of efficiency. It is not possible, with the data at present collected, to compare public and private means of supply in the manner above indicated, for the problem has not, up to the present time, been considered to be one of engineering, but simply one of the tax-rate, or cost to a municipality of its street-lights, and in consequence the figures collected are not those from which we can draw exact conclusions. Furthermore, even when the question of rates has been stated, the total rate to the community for all forms of electrical energy has not been considered, but simply the cost to the taxpayers of such

amounts of energy as are sold to the municipality. It has often been thought that a gain was obtained when in fact a single plant and single management were replaced by two plants and two sets of managers, which necessitated a greater labor cost to the community than before the tax-rate was reduced.

The determining factor in the installation of a municipal plant in many cases, however, involves such questions as the justice of exclusive franchise and the efficiency of the laws controlling corporations. For the solution of problems of this nature it is difficult to see how one can apply such considerations of economy of operation as have been examined in this chapter.

IV.

THE TELEPHONE.

THE TELEPHONE.

By FRANK PARSONS.

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THERE is reason to believe that the telephone may become a more important means of communication than either the telegraph or the post. It is at the same time an assistant and a rival of the older systems. All these means of transmission should be operated together for the sake of good service, economy, and harmonious development. The same considerations that have induced so many nations to put the telegraph in the post-office caused Germany, Luxemburg, Würtemberg, Bulgaria, Bavaria, and other countries to make the telephone also a part of the postal system from the start. In other countries, like Austria, Belgium, France, Switzerland, Sweden, and Great Britain, telephone exchanges were first established by private companies; but the rapidly growing importance to the public of a cheap, extensive, and efficient telephone service, managed in connection

with the telegraph and the mail, brought about a movement toward public ownership which resulted in national purchase of the private exchanges, and the establishment of new ones by the State, so that in the first four countries mentioned above, the telephone has become entirely a public institution. In Sweden the transformation is nearing completion, and in England the trunk-lines have become postal property; and it is generally believed that the government will acquire the entire business of the exchanges when the National Telephone Company's license expires. In Italy and Spain concessions of twenty-five and thirty years have been granted to private companies on condition that at the end of the franchise term the telephone system shall become public property without any payment to the companies.

In Denmark, Finland, and Norway the exchanges are largely in the hands of local companies, co-operative societies, municipalities, and rural authorities. The trunk-lines in Denmark and Norway are built and maintained by co-operative agreement among the exchanges. The cost of a trunk-line is apportioned among the societies using it, and each exchange retains the whole of its receipts for talks over the trunk-line. In Finland, an interurban company owns the trunk-lines. In Holland the government supplied the materials, and the companies owning the exchanges supplied the labor to build

trunk-lines. These lines are maintained by government, which receives seventy-five per cent of the trunk-line tolls. In Russia and Hungary some exchanges are public and some are private property. In Portugal and the United States the business is substantially all controlled by a big private monopoly.

TELEPHONE CHARGES.

Telephone charges and service vary greatly in different countries, as will be seen from the accompanying tables.[1]

In Table II. are given the rates of telephoning for single messages. The figure outside of the parentheses is the charge in cents, independent of the length of the message, and the fraction within the parentheses is the additional charge per word. Thus the ordinary charge for telephoning a letter is two cents plus one-fifth of a cent for each word. Postage must be added to this.

[1] The foreign data given in this chapter have been gathered from government and corporation reports, the writings of experts, and electrical journals of high character, especially the *Electrical Review* of London and the *Journal Telegraphique*, published by the International Telegraph Bureau at Berne, Switzerland. A special debt is due to Mr. A. R. Bennett, the eminent English telephone engineer, whose books and magazine articles have been of great assistance. See his "Telephone Systems on the Continent," "Telephoning in Great Cities," and his writings in the English Electrical Reviews.

TABLE I. Annual Rates.

COUNTRY.	SYSTEM.	ENTRANCE FEE.	ORDINARY ANNUAL CHARGES.
Germany,	State system,	None,	$36
Würtemberg,	" "	"	25
Belgium,	" "	"	30
Switzerland,[1]	" "		8+
France,[1]	" "		30 to $78
Luxemburg,	" "	None,	16
Austria,	" "	$21	21
Sweden,	" "	$14	20
"	Private system,	$14	26
Norway, towns,	Co-operative societies,		10
" "	Private system,		10
Trondhjem,	Municipal system,	None,	13
Christiania,	" "	"	22
Finland,	Co-operative system,	$50	10 to $14
"	Private system,	None,	16 " 24
Denmark,	" "	"	10 " 24
Holland,	" "	"	13 " 100
Italy,	" "	"	14 " 34
Spain,	" "	"	28 " 60
Portugal,	" "	"	38
Russia,	" "	"	50 " 125
England,	" "	"	45 " 100
"	State system,	"	32 " 67
New Zealand,	" "	"	24
United States, (Bell)	Private system,	"	36 " 250
United States, (Interior Dept.),	Government,	Cost, $48	10

In translating European money into American, a mark is figured at 23.82 cents; a shilling at 24 cents; and a franc at 19 cents in large calculations and 20 cents in small ones, where only round numbers were needed. In fact, round numbers

[1] See discussion of Swiss and French systems below.

TABLE II. Rates for Single Messages. (c. means cent or cents.)

COUNTRY AND SYSTEM.	RATES FOR			CONVERSATIONS.		LOCAL TALK BY NON-SUBSCRIBERS.
	TELEPHONING LETTERS.	TELEPHONING TELEGRAMS.	TELEPHONAGRAMS.[1]	BETWEEN NEIGHBORING TOWNS.	BETWEEN DISTANT PLACES.	
GERMANY,[2] State System . .	2 c. + (1/6 c.)	2 c. + (1/6 c.)	2 c. + (1/6 c.)[2]	10 c.	25 c.	5 c.
WÜRTEMBERG, State System,	2 c. + (1/6 c.)	2 c. + (1/6 c.)	2 c. + (1/6 c.)	6 to 10 c.	10 c.	4 c.
BELGIUM, State System . . .	No such service.	Free.	No such service.	7 c.	20 c.	5 c.
SWITZERLAND,[3] State System,	No such service.	2 c.	4 c. + (1/6 c.)[3]	6 to 10 c.	15 c.	2 c.
FRANCE,[4] State System . . .	No such service.	Free.[4]	10 c.	10 c.	10c. to $1.30	5 to 10 c.
LUXEMBURG,[2] State System .	2 c.	2 c.	2 c.[2]	Free.	Free.	7 c.
AUSTRIA, State System . . .	2 c. + (1/6 c).	2 c. + (1/6 c.)	2 c. + (1/6 c.)	12 c.	20 to 40 c.	4 c.
SWEDEN, State System . . .	No such service.	1½ c.	6½ c.	Part free. Part 4 c.	8 to 26½ c.	2½ c.
SWEDEN, Private System . .	No such service.	Free.	6½ c.	Part free. Part 6½ c.	10½ to 29 c.	2½ to 5 c.
CHRISTIANIA,[5] Munic. System	No such service.	5 c. + (½ c.)[5]	8 c. to 13 c.	6½ c.	13 c.	2½ c.
FINLAND, Private System . .	No such service.	No such service.	No such service.	2¼ c.	10 c.	
DENMARK, Private System .	No such service.	5 c.	1½ c. + (¼ c.)	Part free.	10 to 40 c.	4 c.
HOLLAND, Private System . .	No such service.	2 c.[6]	No such service.	20 c.[6]	20 c.[6]	10 c.
ITALY, Private System . . .	No such service.	4 c.	No such service.	60 c.	60 c. up.	1 to 5½ c.
SPAIN,[5] Private System . . .	No such service.	4 c. + (1/5 c.)[5]	4c. + (1/5 c.)[5]	10½ to 14 c.	25 to 40 c.	4 c.
ENGLAND,[3] State System . .	2 c. to 6 c.	Free.	Free *to* subscribers. 6 c. *from* subscribers.	6 to 12 c.	12 c. to $2.	6 c.
UNITED STATES, Priv. System,	No such service.		No such service.	15 to 25 c.	30 c. to $10.	10 to 15 c.

[1] A telephonogram is a message sent through the telephone to be written down by the telephone clerk and delivered by a messenger. It is just like a telegram, except that it is sent over a telephone wire instead of over a telegraph wire. See notes 2 and 3.

[2] In Germany the cost of a messenger is to be added to the rate stated in the table, and in Luxemburg seven cents is added for the messenger. In other cases the rates stated include messenger. See Norway, France, etc., *infra*.

[3] In Switzerland and England the rates stated include delivery within free delivery limits of the postal department.

[4] In France telegrams are telephoned free except in Paris or Lyons. See France, *infra*.

[5] The fraction does not apply to first 20 words. Then 1c. for each 5 words, Spain; and 1½c. for each 10 words, Christiania.

[6] Special subscription besides the charge for each telegram and trunk talk. See Holland, *infra*.

rather than fractions were used wherever consistently possible.

We will first discuss the telephone systems of Norway, Sweden, Switzerland, Luxemburg, Belgium, Germany, Great Britain, and other countries of Europe, where the service has been carried to the highest perfection, and then describe the situation in the United States. The headlines will enable the reader at once to pass to any desired part of the discussion. The points of chief interest are Christiania and Trondhjem in Norway, Luxemburg, Belgium, and Switzerland, the experience of England, and the tables, comparisons, co-operative experiments, and government data given in the last section under caption of "The United States."

Norway.

Christiania, the chief city of Norway, with 150,000 inhabitants, has a telephone system in the management of which the city exercises considerable influence, being the owner of a block of the telephone stock, and having effective representation in the managing council and on the board of directors. There are 5,000 exchange lines. The yearly cost to each subscriber is $22.25 for the first phone; $5.50 to $8.25 for a second phone on the same line to the same subscriber; $8.25 to $11.10 to a third person; so that two neighbors can unite

and obtain good service for $16.00 a year each; and the system pays 5½ per cent on the capital invested, after putting aside large reserves, writing off values of buildings and lines, and providing relief funds for employees.

A subscriber may telephone a message to be written down and sent to the addressee by the messenger, or to be forwarded by the public telegraph. Telegrams may be telephoned from the state telegraph office to any telephone subscriber. A non-subscriber called for will be sought out by telephone messenger, and brought to a telephone station to talk with the caller. For this service the charge is 5 cents, payable by the person called. For telephoning a telegram, either to or from a telegraph office, the charge is 5 cents for 20 words and 1½ cents for each additional 10 words. Telephonograms, or messages sent over the telephone to be written down and delivered by local messengers, may be sent for 8 cents to 13 cents, according to the distance the message has to go. For each body word beyond 30 the charge is increased one-quarter of a cent irrespective of distance. The addressee may send back by the messenger a written reply at half price up to 30 words, — one-quarter of a cent a word beyond that. A subscriber pays 6½ cents for a talk with a neighboring town, and 13 cents for a distant connection. Non-subscribers using public telephone stations pay 2½ cents for a five-minute talk with a subscriber in the city, 13 cents for a five-minute trunk-talk, and can send telegrams and telephonograms at the same rates as subscribers. These messages by telephone delivery really constitute a local telegraph service.

Trondhjem, the third city of Norway (30,000 population), is the banner city in the growing

movement for municipal ownership of the local telephone system. The original exchange was a private one, established in 1882. The rates were low, but the service was unsatisfactory; so that in 1889 the town bought the property, and reconstructed it in the most thorough manner. The town rates are: —

	Per year.
For a business place within 1½ km. (about one mile) of central station	$16.65
For a second business connection by the same person or firm	13.31
For a private house, same distance	8.33
For each 100 meters beyond 1½ km.	1.37

The town builds all lines, supplies the instruments, and maintains the system, the above charges being the only ones subscribers have to pay for the local service.

There are 780 exchange lines and 8 private lines. The average rental received for an exchange line is 49.1 kr., or $13.25, per year. The subscribers speak to surrounding towns (there are 11 of them) within 50 miles at the rate of 4 cents for 5 minutes. The non-subscribing public pays 6½ cents per conversation interurban, and 2½ cents for a local conversation. Each subscriber makes an average of 8 or 9 calls a day, so that the cost of a local conversation to a subscriber is about ½ a cent. The Trondhjem telephone receipts afford a surplus, after covering all working expenses, interest on the capital invested, a reserve of 5 per cent a year on the capital, and insurance of employees against death, accident, and sickness.

In nearly every Norway town of 2,500 people or more, there is an exchange, usually worked by a co-operative so-

ciety or a local company, at rates varying from $7 to $16 a year, the average rate in four co-operative societies reported being $10, and the average in 9 local companies reported is the same. The $7 rate is made by company exchanges in Stavanger and Hangesund, both of which require the subscriber to pay for his instruments and for the construction of his own line. The co-operative society at Grimstad makes an $8.25 rate, and furnishes line and instruments without cost to the subscriber.

Sweden.

In Sweden the International Bell Telephone Company opened exchanges in Stockholm and Gothenburg in 1880. Rates were high and development slow until opposition came through Mr. Cedergren's local company in Stockholm and a co-operative society in Gothenburg, which charged each member the cost of his line and instrument, and $16.66 a year for operation and maintenance, the annual fee to be reduced as fast as circumstances permitted. The plan worked well, and Sweden was soon dotted with co-operative exchanges. The latest statistics available give 158 of these co-operative exchanges in Sweden, — 30 in towns, and the rest in villages and rural communities. In some of the villages the annual assessment for working and maintenance is only $6.25 to $7.50 per subscriber. The state now owns most of the interurban lines, and is fast absorbing the exchanges.

In *Stockholm*, a place of 260,000 people, the Bell Company's rate was $44.43. Mr. Cedergren charged an entrance-fee of $14 and $27.75 per year, or with two subscribers on one line, $22.22 each, an average of about $26. The government bought the Bell plant. It established metallic circuits throughout, and underground work wherever possible, charged $14 entrance-fee, and $22.22 a year for a business-place, and $16.66 for a house, reserving the right to put two subscribers on one house-line. Lower rates, a metallic circuit instead of single wires, underground wires instead of overhead, and a more complete service were furnished by the public company. The state set Mr. Cedergren a pretty good example of competition; but he already had 5,000 subscribers, and the staying qualities of established connections, together with the inertia incident to an entrance-fee, and the fine enterprise displayed by Cedergren saved his business. He converted his system to the metallic circuit, gave his subscribers free trunk-service within 43 miles of Stockholm, and allowed them to telephone telegrams free of charge.

This free telephoning of telegrams, for which the state's subscribers have to pay $1\frac{1}{3}$ cents per message, tends to equalize the annual rates of the two exchanges. The state does not allow Mr. Cedergren's subscribers to participate in the international telephone service; and outside of Stock-

holm the state will not allow its competitors to use the trunk-lines, nor telephone telegrams, nor, in some cases, to communicate with its own subscribers in the same locality.

The services and rates in Stockholm are as follows. It may be noted that the average time consumed in making connection is 8 to 10 seconds.

	STATE TARIFF.
1. Local exchange, average rate	$20 a year.
2. Interurban communication within a radius of 43 miles,	Free.
3. Interurban connection beyond 43 miles	4 cents to 26½.
4. International communication.	
3 minutes to Christiania	40 cents.
3 minutes to Drammen, Drobak, etc.	44 cents.
3 minutes to Copenhagen	55 cents.
5. Telephoning telegrams (per message irrespective of words)	1½ cents.
6. Telephoning messages to be written down and delivered (40 words)	6½ cents.
7. Telephoning *to* a subscriber 40 words in writing, handed in at a telegraph or public telephone station	6½ cents.
8. Calling a non-subscriber by messenger to a public telephone station	6½ cents.
9. Public station service for subscribers or non-subscribers.	
Local conversation in Stockholm	1½ cents.
Outside, within 43 miles radius	4 cents.
Other interurban talk	4 cents to 26½.
International talk, same as above.	

Almost every town, village, and hamlet in Sweden has its telephone exchange; and nearly all are united by interurban lines. The same is true of Denmark. In Denmark and Finland there are cooperative societies, with rates varying from $10 to $24 a year. Private companies in Denmark make rates almost, and in one case quite, as low; but in Copenhagen the monopoly established by the

International Bell Company charges $41.66. *Der Grathianer*, of Zurich, states that on July 1, 1897, the government of Würtemberg reduced the price of telephone messages within 50 kilometers from 12 cents to 6 cents, and within six weeks this change increased the use of the telephone fourfold, thereby doubling the income of the government telephone department.

Holland.

In Holland a private local company at Zutphen (17,000 inhabitants) is making money on a $14.45 inclusive annual charge, with first class metallic circuits and A 1 instruments. More than a dozen other towns enjoy equally low rates, and two go below $13. The Netherlands Bell Company charges anywhere from $17 to $45 in the towns, and in Rotterdam and Amsterdam $50 to $100. In the latter place ten dollars of the hundred go to the town council.

If a subscriber wishes to use the trunk-lines, he must pay a special subscription of $4 a year (in addition to his local subscription), and then pay 20 cents for 3 minutes each time he uses the trunk. If a subscriber wishes his telegrams telephoned, he must pay a special subscription of $2 a year in addition to his ordinary subscription and the 2-cent charge for each telegram. This $2 subscription is remitted, however, to one who subscribes for the trunk-service.

LUXEMBURG.

In *Luxemburg*, a Grand Duchy of 998 square miles (44 by 30), the telephone is entirely in the hands of the state. The capital (18,000 population) had 621 exchange phones in 1895, or 3.4 phones for each hundred persons. The uniform charge is $16 a year. There is no entrance-fee or assessment. No other charge is made upon one located within a mile of a wire (as most people are, so thick are the wires), and for one outside the limit the only additional cost is an initial construction-fee of $20 for each kilometer. The state is netted with trunk-lines; and each subscriber has the use of the interurban wires free of charge, and can talk all over the Duchy as well as within his own town or city, without any payment beyond his $16.

The following services are rendered:—

1. Local communication	$16 a year.
2. Interurban communication	Free.
3. Telephoning telegrams to or from a subscriber	2 cents per message, regardless of its length.
4. Telephoning message to be written down, and delivered by messenger	2 cents per message, plus 7 cents for messenger.
5. Telephoning message to be written down, and posted as a letter	2 cents per letter, plus postage.
6. Public stations.	
To subscribers	Free.
To non-subscribers	7 cents for five minutes talk with a subscriber anywhere in the state.
Two non-subscribers talking with each other, each pays	7 cents.

7. Sending messenger to bring a non-subscriber to public station,
   a. At call of a subscriber, 7 cents and upward, at rate of about 3 cents a mile for messenger.
   b. At call of a non-subscriber, same, plus 7 cents for use of phone by caller.
8. Proprietors of hotels and other public places pay the ordinary rate, and may allow their customers free use of the instruments up to 2,000 calls, after which a charge is made of 7 cents a call.

SWITZERLAND.

In *Switzerland* the government has aimed to bring the telephone within the reach of all, and make the service as good as possible. All trunks are double; and in Zurich, Berne, Geneva, and other cities the exchange-lines have been converted to the metallic circuit, single-wire construction having been abandoned several years ago. The Swiss tariff (since Jan. 1, 1896) provides for a subscription-rate of $8 a year, plus 1 cent for each call. The plan of charging by the call reduces the use of the telephone, so that the calls in Zurich only average two per day, as against eight or nine per day in other well-telephoned countries of Europe, and eight and a half in the United States. At two calls per day, a subscriber would pay $15.25 per annum. An ordinary subscriber making eight calls a day pays $37 a year.[1] Telegrams are tele-

[1] For 1897 the *average* subscription payment, including the charges for extra instruments and extra length of line, was $13. The local conversation taxes averaged $5 per subscriber, so that the total charges for ordinary local service averaged not more than $18 a year for each subscriber.

phoned to or from a subscriber for 2 cents a message. Telephonograms cost 4 cents, plus $\frac{1}{5}$ of a cent a word. A non-subscriber may use a public station at 2 cents for three minutes, and telephoning telegrams or telephonograms costs him 2 cents more than the same service rendered to a subscriber. For interurban trunk-talks the charges are 6 cents up to 31 miles, 10 cents up to 62 miles, and 15 cents above 62 miles to any Swiss distance. The United States Consular Report, vol. 56, 1898, page 584, says, "Switzerland has one of the finest telephone systems in the world. It is owned by the Government, and operated in the interest of all the people."

Austria.

In *Austria* the private companies charged $40 in Vienna and $25 elsewhere. Since the government bought the lines, the uniform charge up to 9½ miles is $21 (except for hotels, clubs, railway stations, etc., where the instruments are to be free to all comers, in which cases the rate is doubled).

Non-subscribers can use the ordinary public stations at 4 cents for local conversation, and for other services at the same rate as subscribers; viz., 12 cents for a talk of three minutes with a neighboring town; international talk from Vienna to Berlin, 66 cents (to Bavaria, Würtemberg, or Switzerland, 25 cents); express talks, or urgent conversations taking precedence of all others (interurban or international, except to Switzerland), triple rates; telephoning

telegrams, 2 cents, plus $\frac{1}{5}$ of a cent a word (4 cents for ten words); telephonograms, same rate; telephoning letters, same rate, plus $\frac{4}{10}$ of a cent for paper and envelope, plus postage of course.

GERMANY.

The *German* postal telephone charges $35.70 a year up to about three miles, and after that the charge is increased by about 75 cents for each 100 yards. This charge is high, and together with the use of single wires insisted upon by the Imperial Post has prevented a development of the telephone at all comparable to what exists in Norway, Sweden, Denmark, etc., where low rates and local control of exchanges have filled even the rural districts with telephones. Additional telephones will be put into the same building or the same piece of property for a second, third, etc., participator on the same wire for $11.90 each; so that subscribers can, by combining, get a rate of $23.80 per telephone year. And if the same subscriber desires an additional telephone in the same property, it will cost him but $4.76 a year. One can talk all over Germany for 25 cents, and conversations between neighboring places cost but 10 cents.

Express talks are at triple rates; international conversations, 25 cents to 66 cents; telephoning telegrams, 2 cents plus $\frac{1}{5}$ of a cent a word; telephonograms, same, plus cost of messenger; telephoning letters, same, plus cost of postage;

non-subscribers at public stations, 5 cents for a local conversation; for other services same rates as above stated for subscribers.

The telephoning of letters is a very convenient thing. It practically extends the time of closing the mails, and it gives a telephone and amanuensis all in one. Suppose a merchant in a town fifty miles or so from Berlin finds that he needs to send a letter to Paris or London after the last mail from his town has gone; he simply telephones his letter to Berlin in time for the night express to Paris, instead of letting the letter wait till the next day, as our merchants in Waltham, for instance, would have to do in case of a similar belated wish to communicate with New York or Philadelphia.

Belgium.

In *Belgium* the telephone trunks and exchanges are all in the hands of the state, and operated with the telegraph as part of the postal service. The lines established by the government are all double wires, and the charge is $30 to $35 within a mile of an exchange. In the areas originally controlled by private companies, and taken over by the State, the wires are mostly single; and the rates (being the original private charges continued in force) sometimes run as high as $50. In many of the larger cities a reduction of $10 a year is

made if the same person or firm subscribe for more than one line. This makes a rate of $40 in Antwerp and Brussels, and $30 in Ghent, Verviers, and La Louvière.

Subscribers may allow non-subscribers to use their instruments free of charge. Hotel, restaurant, and club telephones are free to all. In each district interurban conversations are free. In the Brussels district, for example, a subscriber, for his $30 a year, may talk without restriction or extra payment to Nieuport, 10 miles, to Blankenberghe, 11 miles, to Bruges, 13 miles, to Heyst, 16 miles. A Nieuport subscriber can speak freely with Heyst, 26 miles, and in some areas even much longer distances are covered by the ordinary subscription. From one district to another the charge is 20 cents for five minutes (or 30 cents for ten minutes) from any point to any other point in the kingdom. By making a monthly contract, still lower rates for trunk-service can be obtained. Trunk rates for non-subscribers are the same as for subscribers, but 5 cents is charged for a local call by a non-subscriber at a public station.

The state regards the telephone as a valuable feeder to the telegraph, and makes no charge for telephoning messages to the telegraph office. This telephone service virtually brings the telegraph into the home and to the merchant's desk, and saves a million journeys by messengers each year; as the messages telephoned to the telegraph number about one million per annum, — one for every five private telegrams, and one in each eight telegrams, public and private. The postal telegraph

business has steadily and rapidly grown under this arrangement in spite of the enormous use of the trunk telephone lines, interurban and international. In Holland and Sweden the government authorities at first were much afraid that the trunk-service would diminish the telegraph receipts; but experience in those countries as well as in Belgium has conclusively shown that when a proper inter-relation is established between the telephone and the telegraph, the former adds more as a feeder to the telegraph than it subtracts as a competitor. It is only in countries like England and the United States, where the telegraph and the telephone are not co-ordinated, that the new service really interferes with the growth of the old one.

France.

The French laws of 1837 and 1851, giving the state a monopoly of telegraphic communication, were held to include the telephone. Concessions were granted, however, by the government to private companies, on condition that they should pay 10 per cent of the gross receipts to the state; that the Department of Posts and Telegraphs should construct and maintain the company's lines at prices to be fixed by the department; that the state should have the right to fix rates, and to buy the system at the end of the five-year franchise for the

value of the material employed in it. In 1883 a few exchanges were opened by the Department of Posts and Telegraphs. In September, 1889, the state took possession of the private lines, and at once reduced the rates from $116 to $78 in Paris, and from $78 to $39 elsewhere, except in Lyons, where the charge is $58.50, there being in Lyons, as in Paris, a great deal of very expensive underground work. Using round numbers, the present charges run from $30 to $80, or, if we include the rate for a second instrument, $10 to $80. The rates and services in detail are as follows :—

	Rates.
Paris, subscriber paying for his instrument, but not for line, first instrument	$78 a year.
Second instrument in same building	$10 a year.
Second instrument, not in same building, but on same line, for same subscriber, or another with his assent	$31 a year.
Lyons, subscriber pays for his instruments, not for line; rates $60, $10, and $24 in same order and for same things as in Paris.	
Other towns over 25,000 inhabitants, subscriber pays for his instruments, plus an initial charge of $50 a mile single wire, and $100 a mile metallic circuit, for his line, and (within free delivery limits) a subscription of	$40 a year.
Towns under 25,000, subscriber pays for instruments plus initial fee as above, and	$30 a year.
Telegrams telephoned free, except in Paris and Lyons, where a special subscription of $10 a year is necessary if the subscriber desires this service.	
Telephonograms, or messages telephoned for local delivery by messenger, for every 5 minutes occupied in transmitting message	10 cents.
Public stations, local talk (5 minutes), Paris . . .	10 cents.
Other places .	5 cents.

Yearly subscription for local use of all public stations, $16 Paris, $12 Lyons, $8 elsewhere.

Trunk-talks, interurban, for each 62 miles (5 minutes), 10 cents. (From Paris to Marseilles, 560 miles, 86 cents.)

Night service half price, and commutation rate for a 5-minute talk each day over a specified trunk, 4 cents for each 62 miles, multiplied by the number of days. (Monthly license for 62 mile trunk, $1.20.)

Great Britain.

In England the National Telephone Company until recently has had a practical monopoly of the business, both trunk and exchange. Its annual charge in London is $100; in Manchester and other towns and cities, generally $50; in a few small towns, $45. Mr. A. R. Bennett[1] has lately been calling attention to the fact that the rates are very high, — more than double the charges in many other countries. The National Company has stated that the Continental systems are built of cheap materials, pay small wages, and make no profit. Mr. Bennett replies that the construction in some places, where the lowest rates prevail, is of the very best, superior to that of the National system. For example, in Zutphen, Holland, the rate is $14.45 a year inclusive of all charges, with metallic cir-

[1] Mr. Bennett has been for years, in fact, since 1880, a leading electrical engineer, having been General Manager and Chief Engineer of several important systems, and for some time Chief Engineer of the National Telephone Company for Scotland and Ireland.

cuits throughout, stouter bronze wire than the National uses, the finest instruments, all night service, and 4.2 per cent dividends. The co-operative telephone system of Aarhus, in Denmark, the systems of Christiania, Stockholm, Zurich, Trondhjem, and, in fact, the whole of the Norwegian, Swedish, Swiss, and Belgian services were instanced. Metallic circuits are universal in Sweden, practically so in Belgium, France, and Bulgaria, and largely in use in Switzerland, Norway, and Luxemburg, single construction being regarded as obsolete even in Servia and Roumania, while the English lines continue to be, in large part, single wire. Mr. Bennett tabulated the wages paid in Continental Europe, and showed that for telephone construction they were nearly the same as in England, while for operation they averaged more than in England. He also proved that the telephone in the low-rate countries realized a profit above interest, depreciation, and cost of operation, and brought out the fact that the great trouble with the National was that its capital was water-logged to such an extent that the real capital must earn about 20 per cent in order to pay 5 per cent on the supposed capital.

At the hearings of the recent Select Committee of Parliament on the Telephone, the National Company admitted that its stock was watered to the extent of £1,292,000, or about $6,460,000 on 73,338 miles of line. Mr. Bennett says that those

who have studied the subject estimate the water to be much more than this; but, accepting the company's own figures, the water is $87.75 per line. The Dundee and District Telephone Company's lines in England cost $75 each. The Mutual Telephone Company's lines (double wires) in Manchester cost $84 each. The Christiania Telephone Company's lines cost $60 each; and the Trondhjem municipal lines cost $50.50 each, including the purchase money paid to the original company, which was nearly all waste. It appears, therefore, that the water in the National, on its own showing, is more than the actual cost. The assessment committee in 1890 valued the company's wires in South London at $7.50 per mile of single wire; in view of increase of business, the value was made $12.25 per mile in 1895. It appears that the company gets more than the value of its plant in the annual rates of a single year, even at the provincial charge, to say nothing of the $100 London tax; and every three years (two in London) it receives its entire original investment over and above all operating expenses. Mr. Bennett visited a number of countries in Europe, and carefully studied their telephone systems. His conclusion, expressed in his books, magazine articles, and addresses, is that a good profit can be made, and is made, on a $12.50 rate in small places, and a $25 rate in large places; and that the best instruments

and metallic circuits, with excellent service, can be furnished in England at a profit on a $20 annual charge in places of 10,000 people, $25 in places of 100,000 to 150,000, and $40 in London, with its 4,000,000 and more of people.

There have been several attempts at competition in England. In Dundee, when the National was charging $100, a company was formed with a $50 rate. The National dropped to $25 and the Dundee local to $27.50 for any distance. It paid 9 per cent dividends during the 4¼ years of its existence. It was bought out by the National, and rates put up to $50. The National paid the Dundee Company its whole capital, plus a bonus of 40 per cent. The subscription-list shrank to about half when the rates were doubled. The Sheffield Company paid good dividends on a $35 rate. The National opposed this with a $25 charge, and finally bought it out. The Globe began with a $50 rate, but was bought out at an early stage that the $100 rate might be maintained. The Mutual, in Manchester, started in 1891 with a $25 rate for shareholders and $30 for the general public. The average subscription, after deducting the 10 per cent postal royalty, was $23; and it paid 2.29 per cent dividends per year after putting away 5 per cent as a reserve. This company, too, has been bought off to maintain the monopoly rate of $50 in Manchester. The Select Committee of

Parliament was told that if the National Company were relieved of extraneous charges (10 per cent post-office royalty and taxes), the subscription would be reduced to $31.45; but the company told the Manchester Council, during its investigation, that out of the $50 charge $40 went to expenses, $5 to the government, and $5 to dividends and renewals.

The National Company's service has been unsatisfactory, both by omission and commission, — no telephoning of telegrams or telephonograms or mail-matter, no half-rates on trunk-line talks at night, high rates per year and per talk on the trunk-lines, delay in making connections, and numerous interferences on the lines. The English electrical journals have been full of complaints for a long time, and at frequent intervals questions are raised in Parliament as to what the policy of the post-office is to be in reference to improving the telephone service.

In pursuance of the Act of 1892, the English post-office has been building and buying trunk-lines. It completed the purchase of the National Company's trunk-lines in 1896. For 2,651 miles of trunk-lines, £459,114 was paid, with 29,000 miles of heavy wire, — a rate of £16 or $70 per mile of wire. The charges on the postal trunk-lines are 6 cents for 25 miles, 12 cents for 50, 18 cents for 75, 25 cents for 100 miles, and 12 cents

more for each additional 40 miles or fraction thereof, — high in comparison with the usual European rates, but low compared to those charged in the United States. The post-office has twelve or thirteen hundred subscribers on exchange lines. The rates stated in the official Postal Guide are $47 to $62 metallic circuit within a mile of an exchange in London; $37 to $52 elsewhere; and for single wire, $37 to $47 in London, and $32 to $42 elsewhere.[1]

The post-office has not reduced its exchange rates, nor made any effort to compete with the companies. On the contrary, it has deprecated competition in local telephony as a very serious evil, and has preferred to await the time when the whole service may become public, without the breaks, duplications, and conflicts incident to competing exchanges.

The English Postal Regulations say, "Local messages *to* the renter of telephones, handed in at the post-office into which the wire is led, are sent over the private wire free, and messages called for at the post-office are also delivered free. These messages, if sent over a private wire *to a post-office*

[1] The preoccupation of the better part of the territory by the National Company, the dislike of the post-office to competition in telephone exchanges, and the natural inertia of men, have hitherto prevented the English people from attaining the benefits which could be realized from a good telephone system under the management of their post-office.

before the hour of closing the ordinary letter-box to the public, are subject to a fee of 1*d*. (and 3*d*. if before the closing of the late box), in addition to the charge for postage."

Telegrams are to be telephoned free to and from the postal telephone subscribers; and the Post-office Telegraph Department has lately arranged with the National Company to receive telegrams from its subscribers, even proposing to pay the National a subsidy for the service.

The English Postmaster-General says (March, 1897), that the government has no intention of buying the company exchanges; that in December, 1911, the company will cease to have any right to do business, and all it will have to sell will be its physical plant, which the government will not be obliged to buy. The post-office has shown a strong wish to prevent the building of competing plants in the same locality, with a view, probably, to smaller cost in 1911, when the government may very likely wish to buy the whole system. Competing exchanges in the same place are very disadvantageous, producing delay and difficulty in communicating from one system to another, wasting labor and material, and compelling many persons to pay annual charges in two companies instead of one. In pursuance of this policy, the government has even refused to grant a license for a municipal exchange in Glasgow, though the city

earnestly petitioned for it some years ago, and has again this year (1897) urged it with great force and unanimity.

The United States.

In the United States the telephone business is largely controlled by the Bell Telephone Monopoly.[1] It was expected that the Bell patents would expire in 1898; but in November, 1891, the public was surprised to learn that a new patent had just been issued to the Bell Company (as the assignee of Emil Berliner), covering the identical microphone transmitter which they had controlled for 13 years, and which they could now control under a new patent for 17 years more. The original Bell patent was issued March 7, 1876. Edison, Berliner, and Blake subsequently invented improvements, which were all bought up by the Bell Company, and a patent secured by it in 1881 on the Blake invention, which constituted a perfected application of all the others. Applications were also filed for patents on the Berliner and Edison ideas. After long delay a patent was granted on the Berliner claim, his invention having antedated Blake's. Berliner's application was filed June 4, 1877, the Bell Company bought it in 1878, and

[1] *United States Statistical Abstract*, January, 1897, title, "Telephone."

the patent was issued Nov. 17, 1891. The Federal Government brought suit to set aside the patent, (1), because of the extraordinary delay which was in the nature of a fraud on the public; (2), because of irregularities, collusions, etc., in the Patent-Office aside from delay; and (3), because the subject matter was covered by the Bell patent of 1876. Counsel for the United States asked whether a company should be allowed to nurse applications for patents, and take out a patent on the Berliner application in time to overlap the Bell patent, and afterwards, perhaps, secure a patent on the Edison application in time to overlap the Berliner term, so obtaining a monopoly for three times the statutory period. The government introduced evidence to show collusion with and bribery of patent officials, and the Circuit Court set aside the patent; but the United States Supreme Court reversed the decision, holding that there was not sufficient evidence of fraud. (United States *vs.* American Bell Telephone Company, 167 U. S., 224, decided May 10, 1897.)

The American Bell Telephone Company (the Bell proper) has its head-quarters in Boston. Thirty-odd subsidiary companies, largely organized and controlled by Bell interests, operate exchanges and trunk-lines throughout the country, under license from the Bell. The Bell proper retains the ownership of all the telephone instruments used

by these companies, receiving a rent of about $6 a year for each compound telephone (transmitter and hand phone). The sub-companies keep the annual sums paid by their subscribers, less the $6, which goes to the Bell.

The standard rate for metallic service, unlimited, is $240 in New York, $96 to $180 in Boston within a mile of an exchange, $100 to $250 in Philadelphia. Recently what is called "measured service" has been introduced into these cities and some others. For example, in Philadelphia, within a mile of an exchange, the following charges are made for measured service with metallic circuit: —

No. of Calls.	Yearly Rate.	Extra Calls, Each.
800	$ 90.00	8 cents.
1,000	102.00	7 "
1,200	112.00	6 "
1,800	136.00	5 "
2,400	156.00	5 "

Intermediate service at intervals of 200 calls may be had at proportional rates, and beyond 2,400 calls the charge is $6 for each 200. For a two-party circuit each subscriber pays about one-fifth off the above rate for the same number of calls. Extra calls are charged at 5 cents to 8 cents each. The lowest rate in Philadelphia is $60 for 600 calls a year on a two-party circuit within a mile.

In New York the direct-line measured service is as follows: —

Local Messages.	Annual Rate.	Additional Local Messages.
600	90	10 cents each.
700	98	10 " "
800	106	9 " "
900	113	9 " "
1,000	120	7 " "
1,100	125	7 " "
1,200	130	7 " "
1,300	135	7 " "
1,400	140	7 " "
1,500	145	6 " "

From 1,000 to 1,500, additional messages are $5 a hundred; from 1,500 to 2,000, $4 per hundred, or 6 cents each; and above 2,000 they are $3 a hundred, or 5 cents each.

In Boston the lowest measured direct service, 800 calls, is $90 for a business house, and $60 for a residence.

In Chicago the following rates obtain: —

	Annual Rate, Met. Circuit.	Annual Rate, Grounded Circuit.
Residence, Four-Party line,[1]	$ 60	
Residence, Independent,[2]	125	$100
Business Place, Independent,[2]	175	125

This table gives all the rates not subject to rebate; but column 1 in the tariff makes the rate for each 100 calls $6 up to 1,500 calls, with 8 cents for each added message, then $5 a hundred up to 4,000, with 7 cents for each extra call above the number agreed upon.

[1] i.e., Four subscribers on one line.
[2] i.e., Only one subscriber on a line.

In Detroit the charges (Bell) used to be $75 to $150. But the rates given by the Detroit Telephone Company, started two years ago, are $25 to $30 residence, and $40 to $45 business. A new company has been organized in Indianapolis with $24 and $40 rates. In towns the usual Bell charges are $36 house and $48 business for local service within ten miles, and $75 or more for connection with a city if one is near.

The enormity of these charges becomes clear when it is known that responsible parties are offering to supply telephone services in this country at $1 to $2 a month in towns, and $2.50 in the largest cities.

A few places are reported as having rates of $8 a year for house phone, and $12 a year for business station. A number of cases of exchange rates, $18 house and $24 business place per year, are reported in the Electrical journals for the last two years. A man of large affairs tells me that the interests he represents propose to wire New England on the basis of a nickel a day except in the larger cities. The Standard Telephone Company in Philadelphia offers good metallic underground circuits and fine instruments at $50 house and $75 business, and are now putting in wires for a large number of subscribers. A good company in Chicago offers telephone service at $30 a year; and a citizens' company in St. Louis has been organized

with a large capital to furnish telephone service at $36 house, $50 physicians, $60 business house. The present Bell rates are $100. (*Traffic*, February, 1897.)

The directors of the People's Telephone Company of New York, which originated with some of the influential members of the New York Board of Trade, have given out a statement (October, 1898), to the effect that they will give subscribers a first-class modern telephone service at less than half the present Bell rates, — for unlimited service, $100 instead of $240 in New York, and $75 instead of $150 in Brooklyn. The measured service rates in New York will be $40 for 400 calls in place of $90 for 600 calls. For residences the measured rate for service on private wires will be $30. To families living in apartment houses and flats an unlimited service connecting with all the other subscribers of the company will be given for $1 per month on group lines. The company proposes that the subscribers shall become stockholders, "so that the telephone users here will become the controlling power in its affairs." In other words, the company is to be co-operative, on the same principle as the Wood County Company (see editor's note below); and the dividends may reduce the actual cost of the telephone to the subscribers much below the schedule rates, as is the case with the Wood Company.

We have seen that in Norway, Sweden, Denmark, Finland, Luxemburg, Austria, Belgium, France, and Switzerland, telephone exchange service is furnished by co-operative societies, municipalities, states, and private companies, at an annual charge, usually varying from $10 to $16 in the towns and smaller cities, to $20, $25, or $30 in the largest cities. The construction in Sweden, Belgium, and many parts of Norway, France, and Switzerland, is better than it is here as a rule. The wages paid for operation differ but little from the average here, — the telephone girl seeming to be regarded the world over as a sort of an angel, able to subsist on dreams. The service here cannot compare at all with the service in Europe. We have no express talks, no telephonograms,[1] no telephoning of mail-matter, and practically no telephoning of telegrams.[1]

[1] In Copenhagen, with a third of a million people, city messages will be taken from a subscriber and delivered by messengers for 1½ cents, plus ¼ cent per word, or 10 words for 4 cents (the minimum charge), 20 words for 6½ cents, etc. Messages may be sent to subscribers at the same rates. In Madrid, half a million population, and in all the Spanish exchanges, the message rates to or from a subscriber are 4 cents for 20 words, and 1 cent for each 5 words thereafter. These charges include delivery, and constitute a local telegraph service at very low rates. Our local telegraph service costs 20 cents for 10 words.

[2] The telephone books in some of our cities, Philadelphia for example, state that the subscriber will be connected with the telegraph office for the sending of telegrams to and from him, provided he arranges with the telegraph company to perform the service. For some reason, perhaps because very few of the

Subscribers cannot use the public stations free, as is generally the case in Europe, but must pay the regular rates. If a subscriber or other person asks to have a party called to a public telephone station in order to converse with him, the company collects the toll charge (not less now, 1898, than 15 cents, in a city like New York or Philadelphia), plus messenger service, the latter charge being in the majority of cases practically prohibitive. One has to call the central office if one wants this mes-

subscribers know about the service, the number of telegrams telephoned is very small. The Postal Telegraph Company in Philadelphia has arrangements with 50 or 60 subscribers, and the Western Union has agreements with 12 or 15 more, — less than 100 out of 8,200 telephone subscribers in a population (Philadelphia and Camden) of about one and one-half millions; whereas, in many European countries, every subscriber has the privilege. The Western Union does not care to make such arrangements except with subscribers whose telegrams will amount to $3 to $5 a week, or more, and who are situated at outlying points, far from any telegraph office. The telegraph company does not care to make the telephone too interesting, and *vice versa*. The messages telephoned in Philadelphia do not exceed one in every 200 telegrams, and on the Western Union lines one in 1,000, as against one in every 8 for Belgium. In France 25 telegrams, on the average, are telephoned for each subscriber per year; in Belgium 100, in Switzerland 15, in Norway 9, in Christiania 10, in Philadelphia not over 4. Where there is more than one telephone company, only one is likely to be able to make any arrangements for telephoning telegrams to and from its subscribers, even if it should undertake to do so. It is held no discrimination to give one telephone company a monopoly of such agreements, — the telegraph may choose its own agencies for the receiving and delivering of messages. (People *ex. rel.* Cairo Telephone Company *vs.* Western Union Telegraph Company, 46 N. E. Rep., 731, April 30, 1897.)

senger service. This very day the writer asked the charge for sending a messenger to 19th and Columbia Avenue, Philadelphia (less than a half-hour's ride by street-car), to ask a friend of mine to go to the nearest public station. The reply was 40 cents.[1] This, with the 15-cent toll, would make 55 cents[2] for a service that would have cost 7 cents in Luxemburg if rendered to a subscriber, and 14 cents if rendered to a non-subscriber (7 cents for messenger and 7 cents for telephone talk of 5 minutes). In Christiania the said service would have cost twelve cents (5 cents of it for the messenger); in Stockholm the cost would be 11 cents (6½ cents of it for the messenger); in Belgium it costs only 5 cents to send a message to a person in the same city or in the same district, asking him to come to a telephone station, and fixing the time and place — 6½ cents if the person is in a distant place. In Copenhagen no

[1] The Long Distance Telephone Company is more reasonable in respect to messenger service, their charge being uniformly 15 cents. If one is in Boston, and wishes to talk with a person in New York, Philadelphia, Chicago, or any other city on the long-distance lines, the company will make the appointment for him for 15 cents. Then if he gets the connection with a party in Philadelphia, say, you have to pay $3 for 5 minutes, and one-fifth of the initial charge, or 60 cents in this case, for each added minute, and you can talk all day if you wish.

[2] Such charges are prohibitive. I have called at a considerable number of public stations, and have yet to find an attendant who knows of any case of such messenger service being rendered.

charge at all is made for sending a messenger to call a non-subscriber to a public station to converse with a subscriber.

It is usual for telephone companies here and in England to make a rule forbidding the use by non-subscribers of the instruments belonging to subscribers. This rule is generally put into the contract, and the company claims the right to remove the telephone in case the provision is violated. It is held, however, that telephone companies are common carriers, and must furnish telephones and facilities for communication for all persons without discrimination. In some States this is provided for by statute, but it is equally true at common law.[1] The courts will issue a mandate to compel a telephone company to furnish a party within its area with telephone instruments, and make the usual connections, and render the usual service.[2]

An interesting case occurred in Indiana in 1896. August Fehring was a subscriber of the Central Telephone Company, and had a phone in his drug-store. He permitted Dr. Hudson to use his phone in order to call his carriage from a livery stable. Dr. Hudson had been a subscriber, but had had a misunderstanding with the company, and had ceased to have a phone at his house. It appears

[1] Central Union Telephone Co. *vs.* State, 118 Ind., 194, 206, 207.

[2] *Ibid.*, State *vs.* Telephone Company, 36 Ohio State, 296. Bell Telephone *vs.* Commonwealth, 3 At. Rep., 825 (Penn.).

that the attendant recognized the doctor's voice, or asked who it was; and the telephone office discovered that the connection was wanted by Dr. Hudson. Thereupon the company refused to make the connection unless Mr. Fehring would give assurance that Dr. Hudson should not use the phone. Mr. Fehring would not do this, but brought suit against the company and recovered.[1]

The conversation rates here are about as exorbitant as the annual rates. In our large cities 15 cents is the minimum charge for the local use of the telephone by the general public, — three times the charge in Berlin. In our small towns 10 cents is the minimum Bell Company conversation rate for the public, twice the ordinary European charge where cities and towns are averaged in one uniform rate, and four times the Trondhjem rate, established by the municipal management.

In Austria the rate for an interurban talk is 12 cents within 30 miles, 20 cents within 62 miles, 30 cents within 94 miles, and beyond that to any distance, 40 cents. In Switzerland the rate is 6 cents within 30 miles, 10 cents within 62 miles, any distance beyond that, 15 cents. For distances within 30 miles in the United States the charge

[1] The suit was brought under the Indiana statute against discrimination, which, however, is merely declaratory of the common law (see cases cited in preceding notes), except that it affixes a definite penalty of $100 for each offense, whereas the common law leaves the damages in each case to be assessed according to the circumstances.

runs from 15 cents to 35 cents; and 35 cents to 60 cents or more up to 60 miles; for longer distances the charges run out of sight. Subscribers in Stockholm have free interurban communication within 43 miles, and those of Copenhagen have free communication within 53 miles. In Luxemburg all interurban conversation is free on a $16 annual inclusive exchange rate.

From Berlin to Breslau is 218 miles, or a few miles more than from Philadelphia to Norwich, Conn. The rate in the first case is 24 cents, in the second $2.25 day and $1.15 night. The rate to Pittsburg, only a few miles farther, is $3 day and $1.50 night; to Niagara, double the German distance, $4 and $2; to Boston, 304 miles, $3 and $1.50; to Cincinnati, about three times as far as Berlin to Breslau, $6.50 day and $3.25 night; to Chicago, 820 miles from Philadelphia, $8 and $4. Conversations are held in Germany over distances of 500 miles. In France the charge for 304 miles would be 50 cents, instead of $3 as between Philadelphia and Boston; and 70 cents for 436 miles, instead of $4 as from Philadelphia to Niagara. There is a nominal time limit of three minutes between distant places in Germany, and five minutes in this country and France; but these limits are not enforced except when the wires are rushed.

The English "Post-Office Guide" says, "Where telephone exchanges in different towns are connected by trunk-lines, such lines may be used for conversation by local subscribers and the general public on payment of the following charges:

Between any two towns —
Within twenty miles of each other, — threepence;
" forty " " " " — sixpence;

and so on at the rate of sixpence for every additional 40 miles or fraction thereof; and even these rates have been

somewhat reduced since the Post-Office bought the whole system of trunk-lines. (See above under title 'Great Britain.')

"The charge to the general public for conversation with post-office telephone subscribers in the same town is threepence for three minutes."

From ——, where these words are written, to B ——, is 7 miles, and the telephone rate is 15 cents; to P —— is 18 miles, and the rate is 25 cents; in each case the English postal telephone rate would be 6 cents. From Boston to New York, 200 miles, is $2, — English rate, 60 cents; New York to Philadelphia, 90 miles, $1 — English rate, 36 cents. *Here we have two tariffs, one under public ownership and one under private ownership, both expressly framed on the scale of distance; and the public tariff is about one-third of the private tariff for the same distances.* The English postal tariff, moreover, is high. The people of Trondhjem can telephone to Svorkmo, 47½ miles away, and to ten other places within a 50-mile radius, for 6½ cents per 5-minute conversation, and a local conversation costs 2½ cents; these are the rates for the non-subscribing public. In Germany you can talk all over the Empire for a quarter, and in the first two cases of this paragraph the rate would be twelve cents. The German system abandons the distance scale, and divides interurban communication into two classes, near and far, and adopts a uniform

rate for each class. *In France the government tariff is on the scale of distance, 10 cents for each 62 miles, which, for long distances, amounts to about half the English rate, or one-sixth of the American. And France gives half-rates at night, and commutation rates still lower.*

In Sweden the trunk-rates are 4 cents up to 60 miles, 8 cents for 60 to 150 miles, 13½ cents for 150 to 360 miles, greater distances, up to 767 miles, 27 cents. From Philadelphia to Chicago, about the same distance as the longest Swedish line named, the rate is $8. From New York to Chicago it is $9. The trunk-rates at night are half the day-rates, as in France.

In 1890 Mr. F. C. Waite (in charge of Department of "True Wealth," for the 11th Census) estimated the gross receipts of the telephone at $16,000,000. There were at that time 185,000 subscribers in the United States (*U. S. States Abstracts*); so that the estimated receipts were about $87 per subscriber, in tolls and annual rates. At the beginning of 1895 there were 243,432 subscribers, and at the end 281,695, or 262,000 average for the year. The annual rates had diminished little, if any, and the tolls had increased; so that $23,000,000 of gross receipts are indicated. Now, we have for that year (1895) some figures that enable us to make a very interesting estimate. The income of the Long Distance Company was $1,326,683, and

the tolls other than those of the Long Distance Company were reported as $2,355,488 (nearly 20 cents each for the 12,000,000 local and neighborhood toll conversations in 1895). Wherefore, subtracting $3,682,171 from $23,000,000, we have $19,317,829 for annual rates, or $74 per subscriber. In a few cases we have definite reports from the sub-companies. For example, the New York and New Jersey Telephone Company is reported in Poor's Manual as having average receipts of $123 per phone, and in New York City the average reaches $175 a year in rentals alone.

The Bell Company proper reports two-thirds of its receipts as profit.

Bell Profits in Thousands of Dollars.

	1897	1896	1895	1894	1893	1892
Gross Receipts,	$5,130	$4,327	$5,125	$4,848	$5,781	$5,100
Expenses,	961	944	1,911	1,724	1,855	1,689
Profits,	$4,169	$3,383	$3,214	$3,124	$3,926	$3,411

It is right that any invention should yield a profit, but $21,000,000 in six years seems pretty high.[1]

[1] The expenses are made up as follows: —

	1896.	1897.
Expenses of operation	$499,052	$509,314
Interest and taxes	303,731	273,962
Legal expenses	100,745	136,333
Real estate	40,118	41,561
Miscellaneous	97	. . .
	$943,743	$961,170

In an investigation in New York, the sworn testimony of the officers of the Metropolitan Telephone Company showed that the net profits of that company were 474 per cent in six years on the cash capital invested, — 116 per cent in the year 1885, over 147 per cent in 1886, more than 145 per cent in 1887 — pretty good profits! While the rate was $60, then raised to $150 and again to $180, the company realized $2,843,454 net in six years on an original cash investment of $600,000. In 1895 there were in New York 9,500 subscribers, paying

The assets of the company are:

	1896.	1897.
Telephones	$1,537,761	$1,772,596
Real estate	1,046,126	1,052,696
Stocks	50,511,149	52,827,205
Merchandise and machinery	17,484	18,320
Bills and assets receivable	1,490,930	3,275,060
Cash and deposits	900,271	1,833,964
TOTAL	$55,503,722	$60,779,841

The capital stock is now $25,886,300; the bonds, $2,000,000; the patent account, $12,399,047; new construction, 1897, $8,712,914.

The statistics of operation are: —

Telephones, Dec., 1896	772,627	Dec. 1897, — 919,121
Exchanges, Jan. 1, 1897	967	Jan. 1898, — 1,025
Branch offices	832	937
Miles wire	536,845	626,400
Number of circuits	264,465	295,904
Number employees	14,425	16,682
Number stations	325,244	384,230
Number daily connections	2,630,071	3,099,472

The number of daily calls per station varies in different exchanges from 1.7 to 18, averaging 8.1 for the whole United States. The total number of connections per year in the United States is about one billion.

January, 1897, there were 286,644 miles of wire on poles, 12,597

an average of $175 a year. Half the number pay the standard rate, $240; 3,000 pay a rate based on the service rendered; and 2,000 pay rates below $240 and down to $150. (*Electrical World*, March 9, 1895, p. 309.)

It would have been well for the nation to have bought the patent for $100,000 (as it could have done in the early eighties), and thrown it open to public use by establishing postal trunk-lines, and leasing franchises to municipalities or to private persons under proper guaranties as to charges,

on buildings, 234,010 underground, and 2,818 submarine. January, 1898, there were 327,315 miles of wire on poles, 13,776 on buildings, 282,634 underground, and 2,675 submarine.

The Bell reports show that the company values a telephone instrument at about $2.00, or $4.00 for the pair required at a station.

The 919,121 telephones are single instruments, counting each transmitter as one and each hand phone as one, instead of counting transmitter and hand phone together as one telephone, the way we do ordinarily. The Bell had about 460,000 compound telephones (transmitter and hand receiver together) in use in the United States and elsewhere at the end of 1897, part of them in exchange offices and public stations, but mainly in the hands of the subscribers.

The "instruments," or "telephones," reported by the Bell Company are usually supposed to mean complete telephones according to the ordinary use of that term, including both transmitter and hand phone as one telephone. The author was informed to that effect last year by a telephone official who should have known the truth, which, as he is now informed by a leading officer of one of the great sub-companies, is simply that the Bell Company in their report counts every transmitter as a telephone instrument or telephone, and every hand receiver as another telephone, a fact which clears up the wide discrepancy between the number of "stations" and the number of telephones stated in the report.

service, etc., where the municipal authorities refused to undertake the work. This would have saved the people many millions, and given them a far more ample telephone service, aiding thereby the development of the country.

High charges have prevented the development of telephoning in America. The number of persons to each exchange telephone is much higher here than in many European countries; although our city population, which constitutes the chief user of the telephone, is far greater in proportion than in most other countries considered.

Number of Persons to Each Telephone Station Connected with an Exchange.[1]

	A	B	C	D
	1894–5	1896	1897	1898
Norway	144			
Sweden	147	115	96	85
Luxemburg	160			
Switzerland	140	118	100	88
Denmark	211			
United States[2]	260	230	190	165

[1] All the figures of column D relate to the middle of the year. The same is true of the data for Great Britain, Switzerland, and the United States in the other columns. The other numbers in column C refer to the beginning of the year except the Swedish estimate, which dates at the end of 1897. In columns A and B, most of the data relate to the beginning of the year. The Swiss figure for the beginning of 1896 was 128; for the beginning of 1897 it was 107; and for the beginning of 1898 it was 94. Most of the data of column A, together with an able discussion of telephone distribution by A. R. Bennett, will be found in the London *Electrical Review* for Sept. 27, 1895, p. 374. Some of the figures may vary slightly from the exact truth because of the difficulty of estimating precisely the growth of population between census years.

[2] In June, 1898, the Bell companies had 422,600 exchange

Number of Persons to Each Telephone Station Connected with an Exchange — *Continued.*

	A	B	C	D
	1894–95	1896	1897	1898
Germany	450	397	350	
Holland	600			
Great Britain	636		477	414
Belgium	700	680	640	
France	1,430	1,220	970	
Spain	1,618			
Austria	1,640	1,300		
Italy	2,530			
Hungary	3,140	2,170		
Portugal	3,370			
Russia	13,100	7,000		

stations, and 59,600 private lines. There are two instruments at each station, a transmitter and a receiver; and these, with the telephones used in the offices of the companies and by their agents, make a total of more than a million Bell instruments in the United States. It has not been possible to get precise data as to the number of telephones in the United States outside of the Bell exchanges; but it seems conservative to estimate the total number of exchange stations in the country at about 450,000, which would indicate one station to 165 persons.

There are about as many telephones in this country as in the whole of Europe. It seems remarkable that the country as a whole should have more telephones per thousand of population than the city of Philadelphia, yet that appears to be the result of the figures given out by the companies. The Philadelphia area is, of course, much better telephoned than equal areas through the country as a whole; but Philadelphia contains a crowded mass of people too poor to afford telephones, and another class too economical to pay the present city rates; and these people swell the average population per telephone station beyond the average in many places where perhaps the number of telephones per acre may be less than in Philadelphia.

Massachusetts, the Bell home and our best telephoned State, has about the same number of telephones as Switzerland, and a population slightly smaller than that of the Swiss Republic. The average use of the telephone differs greatly in the two places. The Swiss have to pay for each call, and are besides a frugal

people, so that by the last report local calls average only 500 per year for each subscriber, while in Massachusetts each subscriber averages 2,500 calls per year from his station for exchange service; and at the central office in Boston the calls on unlimited service lines average over 6,000 a year for each subscriber.

United States Consul J. C. Monaghan sent question cards to the various countries of Europe, and states the results in his report from Chemnitz, Feb. 20, 1898. His data are not dated, but seem to relate for the most part to 1896. They are as follows: Number of inhabitants to each telephone in Sweden, 115; in Switzerland, 129; in Luxemburg, 160; in Germany, 397; in Holland, 615; in Belgium, 682; in France, 1,216; in Austria, 1,318; in Spain, 1,597; in Hungary, 2,168; in Italy, 2,629; in Russia, 6,988; in Bulgaria, 13,616; in Roumania, 16,042. Turkey and Greece have no telephones. A comparison of the consul's results with those in the table suggests that in Italy and Holland population may be increasing faster than telephone stations. I am inclined to think, however, that in the case of Italy the list of telephone stations sent to the consul was not complete. In some of the statements that appear from time to time in newspapers and periodicals, private lines are included as well as exchange stations, the population at the last census is sometimes taken without allowance for the increase between the census year and the date of estimate, and occasionally the total number of *instruments* is stated as the number of subscribers, thus doubling or more than doubling the true number.

Norway, Sweden, and Switzerland are the best telephoned countries in the world. Nowhere else does the service approach so near to what it is capable of accomplishing for the people. Luxemburg and Denmark are not far behind the Scandinavian nations. In all these countries the rates are very low, and rural intercourse is highly developed. Leaving out our larger cities, and taking parts of the country fairly comparable with Scandinavia as to population and business, we have nothing on this side of the water that approaches the telephone development of Norway and Sweden. In these countries and in Denmark there is local management of exchanges. Switzerland and Luxemburg have central control with delegation of management, in some cases, to the local exchanges.

In the other countries of the table, the rates are too high for full development of the service, and the management is too highly centralized — completely so in France, Germany, Bel-

Cities show the same contrast.

TABLE III. Ratio of Phones to Population.

	Population.	Number of Telephones.
Stockholm — State system,	264,000 : 1	telephone to each 23 persons.
Christiania — Municipal system,	151,000 : 1	" " 30 "
Trondhjem [1] — Municipal system,	30,000 : 1	" " 38 "
Grimstad [1] — Coöperative system,	3,000 : 1	" " 25 "
Christiansand [1] — Coöperative system,	12,813 : 1	" " 56 "
Fredrikstad [1] — Local private,	11,217 : 1	" " 40 "
Berne, State system	47,000 : 1	" " 40 "
Geneva, " "	79,000 : 1	" " 30 "
Zurich, " "	130,000 : 1	" " 50 "
Luxemburg — State System,	18,000 : 1	" " 30 "
Copenhagen — Local private,	315,000 : 1	" " 70 "
Aarhus [2] — Local coöperative,	33,000 : 1	" " 60 "
Odense, [2] Local private,	30,268 : 1	" " 60 "
Horsens, [2] " "	12,654 : 1	" " 63 "
Frederikshavn [2] — Local private,	2,891 : 1	" " 14 "
Esbjerg, [2] Local private,	1,529 : 1	" " 7 "
Berlin, State system,	1,677,000 : 1	" " 67 "
Dresden, " "	334,000 : 1	" " 100 "

gium, and Austria, and chiefly so in Great Britain and the United States. There is no competition in telephony, except in Stockholm and in Finland, and to some slight extent in Great Britain and the United States. The uniform charge of $36 in Germany makes a reasonable rate in the large cities, but is too high for the small towns and country districts. Experience indicates that central control of the trunk-lines, local management of exchanges under general regulations, and service at or near cost through national trunk-lines and co-operative or municipal exchanges, is the plan most likely to give the people full use of the telephone.

[1] Norway. [2] Denmark.

TABLE III. — *Continued.*

Hamburg, State System,	625,000 : 1	telephone to each	67	persons.		
Brussels, " "	508,000 : 1	" "	200	"		
Antwerp, " "	256,000 : 1	" "	130	"		
Vienna, " "	1,364,000 : 1	" "	170	"		
Paris, " "	2,500,000 : 1	" "	170	"		
The Hague — Private (Bell),	180,000 : 1	" "	470	"		
Amsterdam — Private (Bell),	450,000 : 1	" "	150	"		
Edinburgh — Private (National),	270,000 : 1	" "	270	"		
London — Private (National),	4,430,000 : 1	" "	630	"		
London and Suburbs — Private (National),	5,600,000 : 1	" "	700	"		
New York — Private (Bell),	1,957,000 : 1	" "	108	"		
Greater New York — Private (Bell),	3,200,000 : 1	" "	120	"		
Philadelphia — Private (Bell),	1,300,000 : 1	" "	170	"		
Boston and Suburbs [1] — Private (Bell),	915,000 : 1	" "	60	"		
St. Louis, Private (Bell),	650,000 : 1	" "	127	"		
Chicago, " "	1,750,000 : 1	" "	129	"		

These data for European cities do not cover a later period than 1895 except for England and France, in which case the facts belong to 1896, and the American figures relate to 1897.

In Norway, Sweden, Switzerland, Denmark, and Luxemburg, where telephoning has reached its greatest development, low rates combine with local management of exchanges to give elasticity and adaptability to the service, and bring it within the

[1] In Boston the city and its suburbs, Brookline, Cambridge, Newton, etc., are served by one telephone system, owned by Bell interests.

reach of all the people. If the people of our towns and villages and farming communities would form co-operative exchanges, or secure municipal exchanges, each subscriber paying an initial sum to cover the cost of constructing the lines, the better settled portion of the country could be covered with an efficient telephone service at very low cost. Good lines can be built in ordinary districts at an average cost of $50 to $75 per telephone. The cost of operation in a 50-mile radius need not exceed $8 or $10 a year. That is more than the cost in Trondhjem; interest (4½ per cent) and depreciation (5 per cent) amounting there to $4.37, and total cost $12.33. Municipalities and co-operative societies in Norway, Denmark, Sweden, Finland, France, and other countries have achieved wonderful results with the telephone; and there is no reason why our people may not do as well. The successful municipalization of the telephone in Trondhjem and Christiania has led the Town Council of Rotterdam to build an exchange, metallic throughout, at an annual rate of $31.35 within three miles. Amsterdam has also resolved to establish a municipal system, and Glasgow is ready to do the same if it can get a license from the government.

It was reported in the papers in the spring of 1897, that the farmers of Magnolia township, Putnam County, Ill., have started a telephone exchange,

and have about 50 phones and 100 miles of wire, running into several townships, and uniting the owners with two small and five large towns. The report says, "Good phones with day battery can now be bought for $10; and the wire is quite cheap when purchased by the quantity, and twenty-foot poles for every hundred feet can be had in the home forests of most localities. A phone with a mile of poles and wire can be had for about $18." Many a farmer's daughter is glad to tend the switchboard for $300 a year, which would be $6 a year for each of the 50 subscribers.[1]

The *Electrical Engineer* for April 7, 1897, page 373, describes a Mutual Telephone Company that has been organized in Fillmore County, Minn. The entrance fee is $10, which is applied on construction. Each subscriber pays for his own instrument. The system will be run without cost to subscribers, except the small assessments needed, now and then, for repairs. The report says that the farmers are readily taking to the plan. Some of our private plants clearly indicate what could be done with co-operative phones in this country. For example, the telephone rate in Manhattan,

[1] A report in the *Farmer's Voice* states that the farmers of Lewanee County, Mich., have established telegraphic communication among their homes, and speaks in glowing terms of the many uses to which these co-operative telephone and telegraph lines have been put by the enlightened and energetic farmers of Michigan and Illinois.

Kan., is $1 a month residence, and $2 a month business-place. Allowing $75 a month to the manager, who has other interests, and only spends part of his time superintending the telephone, and subtracting 7 per cent depreciation, a clear profit is obtained considerably above the 10 per cent a year that ambitious capitalists seek to realize on their investments.

The Department of the Interior kindly furnished me with the following facts: In 1894 the Department paid the Bell Company $60 to $125 each for 65 telephones, the total rent being $4,283. The Department employed a lady to attend the main exchange at $600 a year, making the total cost $4,883, or an average of more than $75 per phone per year. In July, 1895, the Department put in a system of its own, — 140 telephones connecting widely scattered buildings in Washington, with four switchboards, the main exchange being in the patent building, and attended by the same lady who had charge of the Bell phones. In addition to her salary of $600, the Department pays an electrician $300 a year to keep the system in repair, making a total operating cost of $900 a year, or $6.43 per phone. At 3 per cent interest and 5 per cent depreciation the Department estimates the fixed charges at $3.80 per phone year, which gives a total cost of $10.25 for what used to cost $75 a year under the Bell *régime*. The three subordi-

nate switchboards are tended by persons already employed by the government before the telephones were put in, and involve no additional wage cost. The instruments cost about $20 a set, and are of very fine make.

This is a very interesting example of what may be done with the telephone under public ownership. These government phones and co-operative systems, together with the municipal successes in Trondhjem and Christiania, and the remarkable showing of Luxemburg, Switzerland, Sweden, etc., with annual rates of $8 to $23, are worthy of the careful consideration of all our people.

There is no better social cement or business developer than the telephone; and besides the utility, think of the happiness of conversing at will with friends in every part of the country. A nation that is not well telephoned is losing one of the best and cheapest of the comforts and utilities within its easy reach.

Suppose the country were netted with telephone wires, and the rates were such as to bring the service within the reach of the great body of the people, what a mighty power the telephone would be for unifying and solidifying the nation, uniting and harmonizing the interests and sentiments of North and South, East and West. If the trunk-lines ran freely across the Rhine, and every town in France could communicate, at a reasonable cost,

with any part of Germany, it is probable that, in spite of the limitations of race and language, the telephone would be found a potent means of healing the breach between those two great peoples, which, more than any other thing, except perhaps the Turkish and Egyptian questions, threatens the peace of Europe. If the new telelectroscope can be practically applied at low cost, so that we may see the face of a distant person while we speak with him over the telephone wire, distance will indeed be vanquished. Friends may talk with each other face to face in spite of intervening mountains and seas. Niagara may be seen and its thunder heard without leaving our homes. The world will be at our feet.

What method should be adopted to secure the best results from the telephone service is a matter of dispute. Some experts of high authority believe in decentralization. They think the trunk-lines should be in the hands of the state or of a single carefully regulated company, but would leave the local exchanges to local enterprise, co-operative, municipal, or private. Others, among whom are some who have done eminent service in extending the Bell system, say that decentralization is likely to prevent the fullest use of long-distance communication, methods and instruments being adopted in some localities that are not fitted for thousand-mile conversations, and that it is best

to have a system practically under one general management, so that local methods and instruments may be adapted to long-distance work. Those who favor decentralization reply that local adaptation to long-distance work may be secured by state regulation; that free play should be given to local co-operative, municipal, and individual enterprise, leaving the choice among these methods to the electors of the municipalities; that a centralized system, if owned by the state, does not tend to develop local energy and patriotism, and is unnecessary in respect to local exchanges, since local effort is able to do the work well; and that a centralized system privately owned tends to limit the service to the more thickly settled areas, to make rates so high .that a full use of the system is not secured even in the favored areas, and to throw great power and wealth into the hands of a small body of capitalists. It is to be hoped that the truth may so clearly appear before the latest development of the means of communication comes into general use, that when telelectroscope systems come to be built, the best plan may be adopted from the start. It seems clear that the prime use of these great inventions should be as civilizing agencies, and not as money-making instrumentalities. And it is also clear, that, while the United States is far ahead of most other countries in respect to its telephone service, there are several

countries of Europe that can teach us very valuable lessons.

If the trunk-lines were in the hands of the post-office, and the exchanges were managed by the municipalities, or co-operative societies or local agencies of the post-office, on moderate salaries, with a small commission on subscriptions, the whole service unified by a solid federation of all the exchanges under elastic postal regulations, and thoroughly co-ordinated with the mails and a national postal telegraph, — in other words, if a system were adopted here similar to that which has proved so advantageous across the sea, — we believe the United States would soon be telephoned as well as any country in the world.

NOTE BY EDITOR.

The operating expenses and the receipts of the French telephone system for 1890–1896 inclusive were as follows: —

DATE.	EXPENSES. (*Francs.*)	RECEIPTS. (*Francs.*)	EXCESS OF EXPENSE. (*Francs.*)	EXCESS OF RECEIPTS. (*Francs.*)
1890	3,849,069	5,372,938		1,523,869
1891	5,221,894	5,404,694		182,800
1892	6,688,489	6,658,795	29,694	
1893	10,953,120	7,610,809	3,342,311	
1894	9,441,739	8,529,941	911,798	
1895	10,853,058	9,561,348	1,291,710	
1896	10,876,652	10,935,967		59,315

With the exception of 1893, when some exceptional conditions may have existed, the receipts nearly equaled the operating expenses. In Belgium in 1896 the receipts

from telephones and telegrams were 6,580,763 francs, of which the telephone receipts were 2,564,578 francs. There is no separation, in the reports at hand, of the expenses of the telephone and the telegraph; but the total operating expenses were 5,872,298 francs. The excess of receipts, or 708,465 francs, was balanced in the official report at hand by the estimate of the value of the services, — 919,538 francs — rendered for the telegraph and telephone systems by the public railroads. However, there seem to have been many gratuitous services performed for the government and the railroads by the telephone and telegraph systems. The total expense of construction of these systems is reported as 13,215,000 francs.

According to the United States Consular Report for August, 1897, the receipts of the Swiss telephones were $600,997 in 1894, $636,199 in 1895, and $836,373 in 1896, while the operating expenses for these three years respectively were $542,213, $567,207, and $839,257. These, which are the only late European reports at hand, taken in connection with the exhaustive discussion of rates in Professor Parsons's chapter, show the tendency of public ownership to extend the service by reducing rates, rather than to attempt to earn interest and depreciation by higher charges. The social benefits gained by extensive increase of the telephone, as in the case of the telegraph, or of public waterworks in a city, doubtless justify this policy.

A report from the Select Committee on Telephones of the British House of Commons, ordered to be printed Aug. 9, 1898, declares that the present telephone system of that country "is not likely to become of general benefit . . . so long as the present practical monopoly in the hands of a private company shall continue." The report specially criticises the failure of the private company to furnish abundant facilities for the mass of the people to

use the telephone for single messages, on the payment of a small fee for each service. "Within the London area, containing a population of over 6,000,000 persons, there are only 237 call-offices open to non-subscribers for the transmission of messages. In Stockholm there are 700 for a population of only one-quarter of a million."

The Continental custom of delivering telephone messages by messenger service, as described above, to those having no telephones, is also commended.

The report of the Committee, which appears to be unanimous, contains the following conclusion:

"On reviewing the whole of the evidence, your committee is strongly of the opinion that general, immediate, and effective competition by either the Post-Office or the local authority is necessary, and consider that a really efficient Post-Office service affords the best means for securing such competition. We further consider that when, in an existing area in which there is an exchange, the local authority demands a competing service, the Post-Office ought either to start an efficient telephone system itself, or grant a license to the local authority to do so."

Before this Committee Mr. A. R. Bennett, a telephone engineer of more than seventeen years' experience and chief engineer of an English telephone company, testified: —

"The capital outlay for (establishing a telephone exchange in) a small or medium-sized town, where one switch-room suffices, is from £12 to £14 ($60 to $70) per subscriber; but in larger towns, where several switchrooms (sub-exchanges) connected by junction (trunk) lines are required; the cost, in the absence of special obstacles, should range from £16 to £24 ($80 to $120) per line, excepting in London, where I will estimate the cost would be £36 ($180) per line."

A committee of twenty-five citizens in Mansfield, Ohio,

organizers of the Mansfield Telephone Company, published, in the summer of 1898, letters from 16 independent companies, giving equally astonishing figures. For example: the company at Elyria, Ohio, reports that its complete plant cost $40 per phone, and with monthly rentals of $2 for business-houses and $1 for residences, it is making 12 per cent on a capital of $20,000. The company at Elkhart, Ind., reports a cost of $60 per subscriber, and operating expenses of $3,500 for 360 phones, leaving $4,000 for dividends and surplus, with charges of $1.50 and $2. This means 16 per cent for profit and depreciation.

The Twin City Telephone Company of Benton Harbor, Mich., reports a probable profit of 12 per cent the first year, with 432 telephones and rates of $25 and $16. The company at Plymouth, Ind., reports earnings of 30 per cent on a capital of $8,000 paid in, with 165 phones, and with rates of $24 and $18.

A prominent business-man, who has constructed a fine telephone plant of 500 phones, on which profits of over 10 per cent are being earned, although the rates are only 25 cents a week for houses and 50 cents a week for stores and business-offices, writes as follows: "Under ordinary conditions, a plant of less than 1,000 phones, with common return wire, overhead wires, about a mile of cable, and clay soil — no rock — will cost about $60 to $80 per phone. The actual cost of a phone ready for position at wholesale price for the material, ready to be assembled on the ground, is $5.10. Dealers charge twice that. The cost of maintenance is about $10 per phone per annum, not including any sinking-fund for repairs or depreciation of plant, or officers' salaries, save of the laborers on the ground, and a treasurer or collector, superintendent, etc."

A prosperous Western company is making over 12 per cent profit on rates of $1 a month for houses and $2 a

month for business-places. It reports that its 220 phones cost $10,000, or $45 per phone, and that the operating expenses average only $9 for each of 170 houses, and 50 business phones.

The cost is larger in large places; but the Detroit telephone company is serving 6,600 subscribers in Detroit, Mich., for $45 a year for business-houses and $30 a year for residences, and for $5 less in each case on a three years' contract, besides furnishing many free telephones. Even in 1891 Toronto secured a rate from the Bell Telephone Company of $45 for business-houses and $25 for residences, aside from a payment to the city of 5 per cent of the gross receipts on a five-year contract.

Richmond, Va., reports 1,500 telephones, with a rapid growth and great prosperity. The charges in that city of 100,000 people are $36 and $24.

A few co-operative telephones, like those in Norway and Sweden, are being established in this country. In Fort Scott, Kan., 120 stockholders are operating such a system. In August, 1894, the Mutual Company was organized. Each stockholder was to own one share of stock for each telephone used, the monthly rent to begin at $1, and to be increased or diminished as the interests of the company required. In the spring of 1895 the plant began operations with 114 telephones. It was then found necessary to make a rate for non-stockholders; as the railroads and express companies would not take the stock, but were willing to pay a good rental. In September, 1898, there were 120 stockholders paying $1 a month each, 60 subscribers paying $1.50 per month for residences, 47 subscribers paying $2.50 per month for business-places, and 5 free telephones. The operating expenses are about $12 per year per phone, and the cost of construction about $50.

Mr. J. A. Gaynor, President of the Wood County Tele-

phone Company of Grand Rapids, Wis., a most interesting co-operative enterprise, thus writes : —

"In the fall of 1894 the Bell Company had about 70 phones in its exchange in this place, at a monthly rental of $4.00 for business and $3.00 for residences. We asked them at that time for a reduction of rates, which they refused. In the spring following we organized a home company with a capital stock of $5,000, divided into 100 shares of $50 each.

"Under our charter we sell stock only to such as rent a phone from the company, selling one, and *only* one, share to the renter of one telephone; and in case any stockholder ceases to rent a telephone from our company, we reserve the right or option to purchase from him his stock at par.

"The above is the plan of our company. We resolved not to construct until three-fourths of the patrons of the Bell Company had subscribed to take their local telephone service from us alone, nor until one-half of the stock was subscribed for. These two things were accomplished in February, 1896. When spring opened we began the work of construction, and had the plant ready for business on July 1, 1896, with 83 telephones in the exchange.

"One month after we started, the Bell Company did not have a local paying telephone in its exchange, and only about 20 of the telephones were suffered to remain in free. About a year later, in the fall and summer of 1897, the Bell people began to solicit the privilege of putting in free phones for any one who would accept them. They got in about 70, when our company began to realize that they meant mischief; for we saw that as soon as they could get their phones into most of the private residences, and had more phones in their plant than the home company had, our business-men might find that phone more valuable to them than ours, and that the move meant the death of the

home company. As soon as the people realized this, they almost unanimously ordered out the free phone. Even those who could not afford the home phone were as loyal as the stockholders in the home company.

"We now have peace, and rest secure in the local patriotism of our people. We have now in the plant 186 phones, put in at a cost of $9,000.

"We increased the stock this year from $5,000 to $10,000. We have sold 100 shares.

We charge for business rentals	$2.50
And for residences	1.50

"We declare a monthly dividend of 1½ per cent on stock, which is credited up to the stockholder on his monthly rental. So the stockholders pay in fact only $1.75 for business and 50 cents for residences.

Of the total cost of the plant	$9,000
We have received from sale of stock . . .	$5,000
And our present indebtedness is	$1,000
The surplus earnings in 28 months are . . .	$3,000

all of which has been applied to extend the plant.

"At the close of this year we will probably reduce business-rates to $1.50, and residence rates to $1.00; and reduce the monthly dividend to stockholders to 1 per cent, or 50 cents per month.

"This will give stockholders their telephone service at 50 cents for residence and $1.00 for business. Our plan is very satisfactory to our people. They have gained through it several substantial advantages. Their service has cost them less than they would have to pay to a company whose chief aim is profit. They have better service. The local service is extended to points that benefit our city as a whole, but extensions to which in the opinion of a private

company would not be justified by earnings. We give such service as the majority want. In case of serious accident by storm, our people are more patient with the home company than they would be with a private company.

"The greatest point gained in the struggle for independence was the building up of a local patriotism, an *esprit de corps*, that has united our people to such a degree that we can protect ourselves against *any* monopoly that oppresses us. It was local patriotism that saved us when the Bell Company offered free phones to our people. I would not recommend our plan to a town lacking in local patriotism. When it is 'each hog for himself,' our plan would be liable to fail.

"Wausau and Merril have companies modeled on our plan. They are a decided success. At Marshfield a majority of the stockholders are offered a large premium for their stock, with a special favor on services hereafter; and they are disposed to sell out to the Bell Company on the terms offered. After offering the stock to telephone renters as we did, only sixteen shares were taken, and the original incorporators took the balance of the 100 shares. If the plan fails there, it will be for the lack of distributing the stock as we did. That city stands notoriously low in local patriotism."

V.

MUNICIPAL FRANCHISES IN NEW YORK.

MUNICIPAL FRANCHISES IN NEW YORK.

By MAX WEST, Ph.D.
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I. THE FERRIES AND DOCKS.

The most ancient of New York's municipal franchises are those pertaining to the ferries and docks, which yielded revenue to the city nearly two and a half centuries ago. Under the Dutch *régime* the rent of the ferry to Long Island seems to have been a perquisite of the governors, although the magistrates of New Amsterdam licensed the ferrymen. The latter were brought under strict governmental control in 1654, when the governor and council fixed the tolls and the hours during which boats were to be kept in waiting. The burgomasters more than once applied to Governor Stuyvesant for the ferry rent as a source of municipal revenue, but without success. Under English rule, however, the city soon came into possession of this income. In 1674 the ferry

was leased at an annual rental of £103 ($257.50), and the next year at £259 10*s*. In 1691 it was farmed out at public outcry at £148 a year, and in 1695 it was again leased at auction at £147 a year for seven years. The ferry was at this period the chief source of municipal revenue, and taxes were levied only on extraordinary occasions.[1]

The rent of the ferry gradually increased with the growth of population. In 1700 it was fixed at £130 a year, and in 1707 at £180; auction sales raised it to £211 in 1712, and to £240 five years later; while it had risen by 1766 to £660, but fell in 1771 to £550. These ferry leases included something more than the mere privilege of running certain row-boats and scows between Manhattan and Long Islands; for the city of New York had built the ferry-houses on both sides, and about the middle of last century the ferry lease carried with it "the dwelling-house, stables, erections, buildings, pier, land and well" in Brooklyn.

In 1774 the city authorities determined to have

[1] The right of the city to the ferry monopoly was confirmed by the Dongan charter of 1686, the Cornbury charter of 1708, the Montgomerie charter of 1730, and subsequent charters and Acts of the State Legislature. The Cornbury charter, in order to protect the authorized ferry from the competition of private individuals, also granted to New York City the unappropriated land between high and low water on the Brooklyn side, from Wallabout to Red Hook, with power to establish and maintain one or more ferries; enough real estate for a landing on Long Island had been purchased by the city several years before.

three separate ferries to Brooklyn, and three leases were executed at an aggregate rental of £670 ($1,675). Two years later all three ferries were let for £450 to one lessee, who agreed to provide a ferry-house on the New York side. By 1805 the rent had risen to $4,325 for two ferries, while in 1811 the Old Ferry alone brought $3,450 a year. It is interesting to note that as early as 1805 it was stipulated that the new lessee should purchase the boats at a valuation fixed by arbitrators; this is usually a condition of the ferry leases to-day.

The use of steam ferry-boats dates from 1811, when leases were granted to John Stevens for a steam-ferry to Hoboken, and to the Jersey Association, in which Robert Fulton was interested, for one to Paulus Hook. Three years later a 25-year lease was granted Robert Fulton and William Cutting for a steam-ferry between New York and Brooklyn, at an annual rental of $4,000 for the first eighteen years and $4,500 thereafter. The city agreed to build and repair the wharves, and apply to the Legislature for an increase in the ferry tolls. Notwithstanding a protest from Brooklyn, the increase of rates was authorized, but an annual commutation of $10 was provided for. In 1836 the successors of the original lessees sold the lease, which had only three years more to run, together with the boats and fixtures, for $100,000.

Out of this transaction arose the New York and Brooklyn Ferry Company and its successor the Union Ferry Company, which for many years played an important part in the history of Brooklyn. The dividends of both these companies were limited, at first to 7 and afterward to 10 per cent; and they reduced the fare for foot-passengers on their various ferries from four to three, and finally two cents, with a commutation rate of seventeen tickets for a quarter. For a short time in the early 50's the fare was only one cent. In 1871, in consideration of a new lease at a nominal rental, the Union Ferry Company reintroduced a one-cent fare morning and evening; but the receipts, instead of diminishing as they were expected to do, steadily increased. The tolls on certain other ferries were afterward reduced to two and three cents by the Legislature.[1]

In 1853 the Legislature required the ferry leases to be disposed of at public auction for periods not exceeding ten years; and since that time the leases have been sold by the City Comptroller under the direction of the Commissioners of the Sinking Fund, a minimum or upset price being fixed for

[1] Many interesting details respecting the ferries are given by Pierrepont, "Historical Sketch of the Fulton Ferry and its Associated Ferries;" Stiles, "History of the City of Brooklyn;" Mrs. Lamb, "History of the City of New York;" Hoffman, "Estate and Rights of the Corporation of the City of New York;" Valentine, "Ferry Leases and Railroad Grants," etc.

each sale. The new charter transfers the general control of the ferries, including the duty of selling the franchises, to the Department of Docks, henceforth to be known as the Department of Docks and Ferries; but the terms of each lease must still be approved by the Commissioners of the Sinking Fund, and the proceeds are to be applied to that fund as in the past. The sales may be either at auction or by sealed bids; the franchise period is still limited to ten years.

By selling the ferry franchises in the manner indicated, they have been made to produce a very respectable revenue. The Union Ferry Company now pays $7\frac{3}{4}$ per cent of the gross receipts of its four ferries between Manhattan and Brooklyn, amounting in 1897 to $65,524. In many other cases the rent is a stipulated sum per annum; in some it is a stipulated amount and a percentage. The Bay Ridge Ferry was leased for $15,000 a year and $21\frac{1}{10}$ per cent of the receipts, but the matter is now in litigation. The total receipts from some 30 ferries in 1896, as shown by the Comptroller's books, were $346,598; but rather more than $15,000 of this amount was wharf rent, so that the ferry franchises alone yielded about $330,000. An increase of wharf rent brought the total for 1897 up to $366,539. These Comptroller's figures, however, include only a small part of the wharf rent paid by ferry companies, the greater part

having been paid to the Department of Docks, even under the old charter. The ferry companies also pay State taxes on their capital and on their earnings.

The city wharf, first built in 1658, was an important source of early municipal revenue.[1] The charters of Dongan and his successors gave to the city the land between high and low water all around Manhattan Island; but much of this was alienated, and it was only in 1870 that the city began to buy it back at high prices, and improve it on a large scale. For twenty-five years the receipts of the Dock Department just about balanced the expenditures, but the latter were chiefly for the acquisition of property and the building of wharves. In 1895–96 the total revenue of the department from leased wharves and wharfage was $2,021,698, and the expenditure only $760,050; in 1896–97 the acquisition of an unusually large amount of new property brought the total expenditures up to $1,739,762, which was still some $327,000 less than the receipts. In the future a handsome profit may be expected from this source. Comptroller Fitch, in the last year of his incumbency, expressed the opinion that some of the wharf rentals were too low, and recommended that wharf privileges

[1] G. A. Black, "Municipal Ownership of Land on Manhattan Island," p. 20 (*Columbia College Studies*, 1: 184); E. D. Durand, "The City Chest of New Amsterdam," *Half Moon Series*, p. 229.

be disposed of only at auction,[1] the mode of disposition already in use in a large proportion of cases.

New York's policy of public ownership of wharves has been severely criticised, chiefly on the ground that it has led to the separation of the warehouses from the wharves, and thus necessitated much extra handling of freight, to the detriment of New York as a commercial port.[2] It is now proposed to overcome this objection by a system of railroad tracks along the marginal street, designed to facilitate freight traffic to the utmost, and spanned by transverse bridges to accommodate the passenger business of the ferries.[3] One important advantage of municipal ownership has recently been demonstrated by the construction of a number of free "recreation piers" adjoining crowded sections of the city. Free floating-baths have long been maintained on the water front by the Department of Public Works.

II. THE SURFACE RAILWAYS.

"The New York and Harlaem Rail-road Company" was created by the Legislature in April, 1831,

[1] *City Record*, 25: 2406 (June 23, 1897).

[2] See Wm. N. Black, "Storage and Transportation in the Port of New York," and "The Crippled Commerce of New York," with an introduction by Erastus Wiman. The Governor of the State has recently appointed a commission to inquire into the causes of the relative decline in the export trade of New York.

[3] Reports of Board of Consulting Engineers, Nov. 11, 1895, to Dec. 15, 1897.

with power to construct a railway north of Twenty-third Street, upon the approval of the Common Council, and to operate it by steam, animals, or any other power, for a period of thirty years. This was the first grant of the power to lay railroad tracks in New York City. The plans were duly approved by the Council, which finally gave its consent to the proposed innovation in December, locating the road in Fourth Avenue, and expressly reserving the right to regulate the speed and the kind of power to be used in propelling the carriages, and the right to order the tracks removed if they should prove an obstruction. The following May the Council gave its consent to an extension of the road south from Twenty-third Street into the heart of the city, subject to the same conditions as those in the original franchise. The rails were to be laid in portions of the streets to be designated by the Street Commissioner, and the company was required to lay and keep in repair a strip of pavement twenty feet wide. No other compensation was exacted. In 1859 the franchise was renewed for a period of thirty years. An Act of 1874 empowered railroad companies to renew their own franchises by simply filing certificates extending their corporate existence; and the New York and Harlem Company took advantage of this Act to extend its privileges to the year 2389.

The period of active street railway construction

was inaugurated with the granting of the Sixth and Eighth Avenue franchises by the Common Council in 1851. The fare was limited to five cents for the entire length of the roads from lower New York to Harlem; and each car was required to be licensed, the amount of the fee being left to the future determination of the Council. The companies were required to report their receipts monthly to the City Comptroller, and to file with him a statement under oath of the cost of each mile of road completed. The city reserved not only the right to have the tracks taken up whenever it saw fit, but also the right to purchase the roads at any time on payment of the cost of construction plus 10 per cent, — a provision found only in these two grants.

The Second and Third Avenue companies obtained their franchises at the end of 1852, and the latter was required to pay the annual license fee for each car then allowed by law. The Council had not yet established a special license fee for street-cars, but relied upon a general ordinance imposing license fees upon stages and stage-coaches; and the courts have held this applicable to the more modern vehicles.[1] The amount of the fee was $20 a year for two-horse vehicles, with half rates for those having wide tires. When the Ninth Avenue line was chartered by resolution of the Council in

[1] City of N.Y. *vs.* Third Avenue R. R. Co., 117 N.Y., 404.

1853, it was explicitly required to pay the annual license fee of $20 a car. A general ordinance passed at the end of 1858 fixed the license fee at $50 except for small one-horse cars, which were to pay $25; but the courts held that where an agreement had been entered into without mention of a license fee, or where the amount of the fee had already been fixed, it could not thus be imposed or increased.[1] An ordinance of 1875 exempted from license fees the companies which paid 3 per cent of their gross receipts, or whose franchises had been sold at public sale to the highest bidder.

For fifteen years, beginning in 1860, street-railway franchises were granted by the State Legislature exclusively, usually without provision for any compensation, though in some cases a percentage of the gross or net receipts was exacted, and one company was required to pay instead a fixed sum of $1,000 a year.[2] Two or three franchises granted in the early seventies provided that the compensation to the city should be determined by commissioners appointed by the Supreme Court, in the same manner as compensation to private owners under the General Railroad Act. The compensation for the New York and Harlem Company's extensions

[1] City of N. Y. *vs.* Second Avenue R. R. Co., 32 N.Y., 261; City of N.Y. *vs.* Third Avenue R. R. Co., 33 N.Y., 42.

[2] The details for this period are given in Durand's "Finances of New York City," p. 234.

above Seventy-ninth Street were determined in this manner, that for the branch to Astoria Ferry being fixed at three per cent of the gross receipts the first five years and 5 per cent thereafter. In only two cases[1] was an auction sale of the franchise provided for, although as early as 1857 the Legislature had decreed that any stage route or privilege thereafter granted by the Common Council should be disposed of at public auction.

The granting of franchises by the Legislature was stopped at the end of 1874 by a constitutional amendment prohibiting special legislation granting the right to lay railroad tracks, or any exclusive privilege, immunity, or franchise. This amendment also laid down the mode of procedure which has been followed ever since in laying out new routes. It required, besides the consent of the local authorities, the consent of the owners of one-half in value of the abutting property, or in lieu thereof the approval of commissioners appointed by the General Term of the Supreme Court, confirmed by the court itself.

The first general Act relating to street railways as distinct from other railroads was passed in 1884. It gave to the local authorities of any incorporated city or village optional power to sell at public auc-

[1] The Twenty-third Street and One Hundred and Twenty-fifth Street lines (Laws of 1869, chap. 823 ; Laws of 1870, chap. 504).

tion, after due notice, franchises to construct, operate, or extend street railways. Every corporation constructing a street railway in a city of 250,000 or more inhabitants was required to pay to the sinking-fund of the city at least 3 per cent of the gross receipts for the first five years, and 5 per cent thereafter.

The vulnerable point in this well-meant law was at once disclosed by the famous Broadway franchise steal, when the Board of Aldermen, overriding the mayor's veto and prescribing no compensation to the city other than the minimum required by the statute, bestowed upon the Broadway Surface Railroad Company a route from Union Square to South Ferry for which the Cable Railway Company had offered a bonus of $1,000,000. This transaction resulted in the indictment for corruption of nearly the entire Board of Aldermen and the officers of the company; and it was shown that the franchise had cost the company, in bribes of $20,000 an alderman and something for go-betweens, just half what the Cable Railway Company had offered to pay the city for it.[1] Only two or three aldermen were finally convicted and imprisoned, the others escaping by turning state's evidence, by flight, by death, and by the law's delay.

[1] Final Report of the Committee on Railroads relative to the Broadway Surface Railroad Company, Senate Document No. 79, 1886.

Jacob Sharp, the leading spirit of the railroad company, was convicted at his first trial, but broke down under the strain and died while awaiting a second. The charter of the offending company was promptly annulled by the Legislature in 1886; but the Court of Appeals held that the franchise or interest in the street was perpetual and indefeasible, and hence that it survived the corporation, and vested in the directors as trustees for the creditors and shareholders.[1] The General Term of the Supreme Court, however, before confirming the report of its commissioners approving the route, had imposed a condition under which the city secured $40,000 a year, besides the statutory percentage and car-license fees. Afterward, when the Board of Aldermen granted permission for the use of cables, it was required that the payments should not fall below $150,000 a year.

The Broadway scandal was quickly followed by the passage of the Cantor Act of 1886, which made the sale of street-railway franchises at auction obligatory in all incorporated cities and villages, except in the case of companies then organized in places of less than 40,000 inhabitants; the minimum compensation for cities of 250,000 or more inhabitants was fixed as before at 3 per cent of the gross receipts for the first five years and 5 per cent thereafter. When the provisions of this Act were

[1] People *vs.* O'Brien, 111 N.Y., 1.

incorporated into the General Railroad Law of 1890 their application was restricted to cities of 90,000 or more inhabitants, and in 1892 it was further limited to the single city of New York. What remained of the auction principle seems to have been repealed by section 77 of the Greater New York Charter, which provides simply that section 93 of chapter 565 of the laws of 1890 and its amendments shall have no application to grants made under this title of the charter. The language of the section gave no hint of its purport, and in the hasty consideration of the charter by the public and by the Legislature there was no discussion of the point; indeed, it was not until after the adjournment of the Legislature that the effect of the section was known even to Senator Cantor himself, and it was much longer before the secret was out in the City Comptroller's office. As if to add to the confusion and uncertainty surrounding the subject, it is provided in another part of the charter that "nothing in this Act contained shall repeal or affect . . . the existing general laws of the State in respect to street surface railroads." The unseemly haste with which the charter was rushed through the Legislature, without opportunity for amendment or free discussion, while it may have been necessary if there was to be a Greater New York that winter, was, to say the least, very unfortunate. If there had been time for a thorough public discussion of

the important provisions of the charter, as there ought always to be when a fundamental law is about to be adopted, the repeal of the auction principle certainly would not have passed unchallenged, and the advocates of competitive sales would have been able to make a strong showing in their favor.

The Cantor Act was not without serious defects, chief among which were its failure to prescribe any limit to the duration of franchises, the too rigid minimum price, and the ease with which corporations could escape from their contracts when made. There was also an unnecessary requirement that bidders must be already incorporated as street-railway companies, which discouraged free competition because of the heavy expense involved in incorporation. All of these defects might have been remedied by a closer imitation of the law relating to ferries. But even as it stood, the Cantor Act was a decided success as compared with previous conditions; it effectually prevented bribery, and it has added something to the present and future revenues of the city. Nearly all the franchises granted under it have yielded either the minimum percentage or else only one per cent or less above the minimum, emphasizing the importance of a movable upset price; but in a few cases the competition between bidders has resulted in unexpectedly liberal offers. In 1887 the North and East River Railroad Company secured the right to run a rail-

way through Fulton Street for 35 per cent of the gross receipts in addition to the legal minimum. After six years the company claimed to be unable to pay the percentage agreed upon, and submitted figures to show that it had been losing money; and the claim of the city was accordingly compromised by the Sinking Fund Commissioners for 5⅛ per cent. Another company offered 29⅕ per cent besides the minimum percentages for a crosstown line in Twenty-eighth and Twenty-ninth Streets, which was never operated until the obliging Sinking Fund Commissioners threw off all but the legal minimum and one-half of one per cent. In the autumn of 1895, there were two sales at remarkably high figures, although the routes in both cases were in the outlying part of the city north of Morningside Heights. The route commonly known as the Third Avenue Extension, although it lies on the western side of the city, was sold to the Third Avenue Railroad Company for 38½ per cent besides the statutory minimum and a cash bonus of $250,000; but this sale has been annulled [1] on the ground that the extension really consisted of two separate routes, and also because of the provision for a cash bonus, which was held to be unwarranted by the statute. The other sale was even more remarkable. There were three bidders at first, but one soon dropped out. The others continued run-

[1] Beekman *vs.* Third Avenue R. R. Co., 153 N.Y., 144.

ning up their bids until, when nearly 40 per cent had been bid, the People's Traction Company suddenly offered the entire receipts. The other corporation retaliated with a bid of 100 per cent besides the statutory minimum. This bid was immediately protested against on the ground that no company could pay more than the entire receipts; but the Assistant Corporation Counsel advised the Comptroller to let the bidding continue. The result was that at the close of office-hours the People's Traction Company had offered $6{,}975\frac{1}{16}$ per cent, or nearly seventy times the entire receipts. The next day the representatives of both companies were on hand to continue the bidding, but the third company had obtained an injunction against the continuance of the sale. Then followed a year's litigation, ending in the award of the franchise to the People's Traction Company for 100 per cent of the gross receipts; but the case has been appealed by the defeated company. The People's Traction Company explained that the route in question was needed as a connecting link with a proposed road beyond the city limits, and accused both its competitors of being "dummy" corporations, really bidding in the interest of the "Huckleberry" road.

The "Huckleberry" road, known in law as the Union Railway Company, is an anomalous corporation whose extraordinary privileges indicate the

unwillingness of the Legislature to be bound by its own enactments. It was created in 1892 by a special Act, and was granted immunity from all the provisions of the General Railroad Law. Apparently with a view to evading the constitutional prohibition against special legislation in railway matters, the Act was drawn as an amendment to an old statute of 1863, which had authorized the construction of railway tracks in the towns of West Farms and Morrisania. The act of 1892 authorized the original company to consolidate with any other street-railway company whose route lay north or east of the Harlem. Instead of directing a public sale of the franchise, it simply provided that the Union Railway Company should pay 1 per cent of its gross earnings whenever they should exceed an average of $1,700 a day for six months, and an additional 1 per cent for each multiple of that amount, in lieu of all percentages which any of the roads consolidating to form the new company were required to pay; so that no revenue has been received from this source. Even the customary requirement of paving between and along the tracks was omitted, and this highly favored company was required merely to keep in repair such paving or macadam as the city might lay between the rails of its tracks. Grave doubts are entertained by lawyers as to the constitutionality of this special Act.

During recent years nearly all the street-railway lines on Manhattan Island have been absorbed, either by consolidation, by lease, or by purchase of stock, by the Metropolitan Street Railway Company. The only rival of the Metropolitan Company, as far as surface traffic is concerned, is now the Third Avenue Railroad, which has obtained control of the only lines in Manhattan unaffiliated with the Metropolitan system, and has recently reached out into the Bronx by purchasing a controlling interest in the "Huckleberry" road. The intense rivalry between these two great systems, besides leading to an offer of more than two-fifths of the gross receipts for the Third Avenue or Kingsbridge Extension, has had some other interesting, though ineffectual, results. When the Metropolitan Company applied for permission to change the motive power on the Sixth and Eighth Avenue lines from horses to underground electricity, after a very successful test of the latter power on other lines, the opposition of the Third Avenue Company prevented immediate action; and in the meantime public sentiment was aroused to demand compensation for the privilege. Many influential organizations, representing nearly all classes in the community, urged the Board of Aldermen to take advantage of the city's reserved right of purchasing the roads at 10 per cent more than the cost of construction, in order to lease them on the best

possible terms. The Third Avenue Railroad Company offered to purchase the two roads from the city for $1,000,000, and pay 5 per cent of the gross receipts, or to lease them for an annual rental of 10 per cent of the cost of purchase and 5 per cent of the gross receipts, the rental not to fall below $100,000 a year.[1] From another source came an offer of $2,000,000 and percentages amounting to at least $100,000 a year, in addition to the amount required to purchase the existing tracks;[2] and various other offers were made. In a suit to enjoin the Commissioner of Public Works from issuing the permit for change of power on the Eighth Avenue line, the right of the city to require the surrender of the property has been denied by the Court of Appeals[3] on the ground that the Common Council had exceeded its powers in granting the franchise of 1851. The grant had been confirmed by the Legislature three years later; and the Court of Appeals had held, in a case involving the liability of the company to license fees, that the confirmation extended to the contract between the city and the company;[4] but the court now refused to adopt this view with reference to the part of the contract under consideration.

[1] *City Record*, April 1 and June 3, 1897.

[2] *Ibid*, May 14, June 14, and June 22, 1897.

[3] Potter *vs.* Collis, 156 N.Y., 16.

[4] Mayor, etc., of the City of New York *vs.* Eighth Avenue R. R. Co., 118 N.Y., 389.

Although nothing came of this project for municipal ownership, the city does own half a mile of double track in one of the transverse roads through Central Park. The Legislature in 1888 authorized the Department of Public Parks to have this track laid, with the concurrence of the Sinking Fund Commissioners; and the work was done by contract at a cost of $11,998, including an inspector's fee of $48. The operation of the road was delegated to the Second Avenue Railroad, now a part of the Metropolitan system. The rental is $300 a year, or only 2½ per cent on the investment.

Aside from the rental of this municipal line, the city revenue from street-railway franchises was $302,111 in 1896, and $351,883 in 1897. Nearly one-half of these amounts was for the Broadway franchise, and nearly all of the remainder was for other lines controlled by the Metropolitan Company. The Third Avenue Company pays nothing at all on its main line, claiming that the Revised Ordinances impose license fees on horse-cars only; and this question is before the courts. The amount received for street-railway franchises has usually been much less than the revenue from ferries, although in some cases the City of New York controls only one end of the latter. It is safe to say that the street-railway franchises are worth much more than the ferry privileges; and the inevitable

conclusion is, that the greater success in dealing with the ferries is due to the longer time and more perfect manner in which the system of public sale has been in force. The amounts given in both cases are in addition to taxes, which in the case of the street railways amount to more than the franchise payments,[1] being levied on earnings and on dividends as well as on the tracks and other property.[2] The revenue from railway franchises, however, is sure to increase rapidly as the lines authorized within the past five years become subject to the 5 per cent minimum.

In connection with their taxes and franchise payments, the railway companies are required to make financial reports annually to both State and City Comptrollers; and both officers have power to examine the companies' books. More elaborate reports, including much besides financial statements, are made to the State Railroad Commission, which has a general supervision over all the railroads in the State. This Commission is authorized to make recommendations, which, if just and reasonable, may be enforced by the courts. The burden of supporting the Commission is divided among all the railways, one-half in proportion to

[1] *City Record*, May 13, 1897.

[2] The rates are 1 per cent of the gross earnings and 3 per cent of the dividends in excess of 4 per cent of the actually paid-up capital. Laws of 1896, chap. 908, §185. There is also a general tax on the organization of corporations.

net income, and one-half in proportion to mileage; and the fees for this purpose are added to their taxes. As the duties of the Commission extend to all railroads, the street railways necessarily receive but a small part of its attention. Various municipal authorities also exercise some authority over them, sometimes concurrently with the State Commission. Thus, the form of the rails must be approved by the Commissioner of Highways, and the Board of Health claims jurisdiction where safety is involved, although the State board also takes cognizance of both these matters. No authority has been able thus far to prevent overcrowding, which indeed seems unavoidable in New York at present, because in Broadway at least the tracks are already utilized to about their full capacity; but the Board of Health has attacked this problem also, besides requiring a certain proportion of closed cars all summer. The chief problem relating to safety has arisen in connection with the dangerous curve at Broadway and Fourteenth Street, around which the cable cars were until recently accustomed to swing at full speed. As a result, this famous curve was immortalized in magazine fiction, and acquired the appropriate newspaper name of "Dead Man's Curve." It was not until after a long discussion of slow cables, tunnels under Union Square, short cuts through private property, and other plans, that the Metro-

politan Company at last adopted the simple expedient of a different grip permitting a reduction of speed.

Oversight by permanent State and local officials was supplemented by the appointment in 1895 of a special Assembly Committee to investigate the street railways of the State. The committee found a great deal of the most flagrant over-capitalization, covering up exorbitant profits. It recommended bills limiting capitalization to one and one-half times the cost of construction, and requiring companies earning more than five per cent on their stock to sell thirty tickets for a dollar for morning and evening traffic. But the agitation which followed was ineffectual. With the present five-cent fares, the cost of operation is only 54.11 per cent of the gross earnings on the Metropolitan lines, and 55.62 per cent of the gross earnings on the Third Avenue System.[1]

The Assembly Committee took some testimony with reference to cost of construction, among other things, but learned comparatively little about the cost of the New York City lines. Officials of the Syracuse trolley roads testified that the cost of construction in that city was nearly $13,000 per mile of single track, without overhead construction, or about $16,000 altogether, aside from the cost of

[1] Report of the Board of Railroad Commissioners, 1897, vol. ii., pp. 1017, 1137.

paving between the rails. On the other hand, the cost of the Albany Railway was shown to be only $11,477 a mile, including $4,000 for overhead construction, and that of the "Huckleberry" Road only $10,500 or $11,000 a mile; the expensive 90-pound girder rails being used in both cases. The cost of horse-car tracks in New York City at the time of the inquiry was stated to be about $6,000 a mile; the line across Central Park, which cost the city twice that amount, was built several years before, on concrete foundation, and by contract. A high official of the Third Avenue Company testified that the most difficult cable construction had cost $100,000 per mile of double track, and estimated the cost in ordinary streets at 60 per cent of that amount.[1] The equipment of the Metropolitan line, where cars run very close together, is reported by the company at $42,222 per mile of road. Yet this company is capitalized at more than $2,275,000 per mile of road owned, including cable, horse, and underground electric lines. The stock and bonds of the Third Avenue Company amount to a little more than $1,000,000 a mile, while the trolley lines of the "Huckleberry" Road, which watered its stock through the common ex-

[1] Report and Testimony of the Special Committee of the Assembly to Investigate the Desirability of Municipal Ownership of the Street and Elevated Railroads of the Various Cities of the State. Assembly Document No. 53, 1896, pp. 694, 910, 973, 1097, 1165, 1376.

pedient of a construction company, stand charged with $187,000 per mile of single track. The over-capitalization of some of the horse-car lines is equally flagrant. Although the merging of half-a-dozen corporations into the Metropolitan Street Railway Company was accomplished without any increase of the total capital, it was followed by a sudden increase of the capital stock from $16,500,000 to $30,000,000, and later by other stock and bond issues made necessary in part by the introduction of electric power; yet the stock quotations are rapidly approaching 200. The rentals paid to lesser companies, with one exception, range from 8 to 15 and 18 per cent on the stock, besides interest on the bonds. The dividend of the Metropolitan Company itself is only 5 per cent a year; the Third Avenue Company pays about 8 or 9 per cent, and its stock ranges from 145 to 194½.

INCOME ACCOUNTS, 1896–1897.

	Metropolitan Street Ry. Co.	Third Avenue R. R. Co.
Gross earnings from operation,	$8,888,805	2,590,474
Operating expenses,	4,810,235	1,440,768
Net earnings from operation,	4,078,570	1,149,706
Income from other sources,	646,220	45,442
Total income,	4,724,790	1,195,148
Taxes, etc.,	545,176	117,283
Net divisible income,	4,179,614	1,077,865
Rentals,	2,171,800	
Interest on funded debt,	470,000	250,000
Dividends,	1,200,000	875,000
Surplus (+) or deficit (−) for the year,	+337,814	−47,135

The foregoing table shows the income accounts of these two companies for the year ending June 30, 1897, at which date they were capitalized at $39,400,000 and $15,000,000 respectively.

III. THE ELEVATED RAILWAY.

The demand for quicker transportation than that afforded by horse-cars led as early as 1866 to the appointment of a Senate Commission, which, after advertising for plans at home and abroad, reported in favor of the plan for an elevated cable railway submitted by Mr. C. T. Harvey. The Legislature accordingly passed an Act providing for a short experimental line of that description in Greenwich Street, to be constructed by the West Side and Yonkers Patent Railway Company. After the approval of this line by commissioners provided for in the Act, it was to be extended and operated under the direction of the same commissioners. The fare was fixed at 5 cents for less than two miles, and one cent for each additional mile; but the company was given the option of adopting a uniform fare of 10 cents for a limited period, after the road should be completed to the Harlem. The city was to receive 5 per cent of the net income as compensation for the use of the streets. An Act of the following year devoted the proceeds to the improvement of the streets occupied by the structure, and

declared the payment to be a matter of agreement in the nature of a contract, entitling the company to the privileges and rates of fare specified; though at the same time the Legislature expressly reserved the right to "alter, modify or repeal this Act." The Commission reported favorably upon the experimental section; and the company, under its new name of the West Side Elevated (Patented) Railway Company, constructed a single track as far as Thirtieth Street. The road was not at first financially successful, and having been sold at a sheriff's sale, was acquired in 1871 by the New York Elevated Railroad Company, which extended the original Ninth Avenue line northward, and built a line also in Third Avenue.

The Second and Sixth Avenue lines were constructed by the Gilbert (afterward the Metropolitan) Elevated Railway Company, incorporated in 1872. The fare on these lines also was fixed at 10 cents, but the company was required to run special cars and trains morning and evening at half-fare. The so-called "Rapid Transit Act" of 1875 provided for the appointment of commissioners to determine the necessity for new routes, and decide upon the plans, the time for construction, the maximum rates of fare, and the hours during which special cars and trains should be run at reduced fares; and both companies completed their roads under this Act. The routes proposed for the New

York Elevated Railroad Company were so opposed by property owners that it was necessary to obtain the consent of commissioners appointed by the General Term of the Supreme Court, approved by the court itself and finally by the Court of Appeals.[1]

The Manhattan Railway Company was organized in 1875 under the auspices of the Rapid Transit Commissioners, and in 1879 gained control of all four lines by leases for 999 years, or as long as it should continue to exist as a corporation. The new company agreed to pay to each of the old companies interest and principal on $8,500,000 of bonds, 10 per cent dividends (afterward reduced to 6 per cent) on $6,500,000 of stock, and a rental of $10,000 yearly, besides issuing its own stock to the amount of $13,000,000, representing only water, for *pro rata* distribution among the stockholders of the other two companies; thus making the total capitalization $43,000,000. This agreement was afterwards replaced by a consolidation of the three companies.

The Manhattan Company was originally permitted to collect a 10-cent fare from the Battery to Fifty-ninth Street, or 15 cents to the Harlem, but was required to run half-fare cars morning and evening. In 1880 Mr. William W. Astor introduced a bill at Albany reducing the fare to 5 cents at all hours; and the Board of Aldermen unani-

[1] Matter of New York Elevated R.R. Co., 70 N.Y., 327.

mously passed a resolution urging its passage, but in vain. In 1883 a similar Act was passed by the Legislature, but vetoed by Governor Cleveland. The chief reasons given for the veto were, (1) that there was a contract as to the rates of fare, and (2) that if the Legislature had power to reduce the fare at all, it had by statute promised not to do so until it should be ascertained that the return on the capital invested exceeded 10 per cent. The Legislature accordingly directed the State Railroad Commission to examine into the financial condition of the company. The majority of the Commission, by including taxes under operating expenses, found that the net income was about 7½ per cent on a capital expenditure of $22,683,253, and decided that it would be illegal and unjust to innocent purchasers of stock to reduce the fare. The minority made the capital actually expended a little less, and the net income 10.68 per cent; and recommended an extension of the 5-cent hours morning and evening. The $13,000,000 issue of stock was characterized as "only a pyramid of water, on a pedestal of transparent fraud."[1]

The average fare at this time was 6.86 cents, of which 1.62 cents was devoted to interest on bonds, and .99 of a cent was applicable to dividends. The profit on each passenger was therefore 2⅔

[1] Report of the Board of Railroad Commissioners in Response to a Resolution. Assembly Document No. 162, 1883.

cents. The company estimated that in order to derive the same revenue from a uniform 5-cent fare it would be necessary to carry 327,320 passengers a day, or 90,714 more than it was then carrying. That point was easily passed four years later, when the fare was finally reduced to 5 cents at all hours. The number of passengers at once increased from 115,109,591 to 158,963,232 in a year; and there was no interruption, but rather an acceleration, of the steady gain in gross receipts, though the net earnings showed a slight falling off the first year. The high-water mark of traffic was reached in the year 1892–1893, when the number of passengers carried was 219,621,017.[1] Since then the competition of the cable and electric roads has affected the business somewhat; but the company still carries more than 180,000,000 passengers a year, and until recently paid 6 per cent dividends on $30,000,000 of stock, besides interest on bonded indebtedness. But for three or four years this necessitated drawing to some extent upon the accumulated surplus, and so the quarterly dividends were reduced in 1897 to 1 per cent.

In the year ending June 30, 1897, the gross earnings were, from operation, $9,163,743, and from other sources, $180,277; the operating ex-

[1] This figure is for the fiscal year ending Sept. 30. Investors' Supplement to the *Commercial and Financial Chronicle*, Apr. 30, 1898, p. 82.

penses were $5,302,352, taxes $820,171, and interest on funded indebtedness $1,886,846; leaving only $1,334,651 of the year's income applicable to dividends. The operating expenses were not quite three cents for each passenger.[1] The stock and bonds now amount to nearly $70,000,000, or a little less than $2,000,000 a mile. The cost of construction is said to have been $750,000 a mile; but in 1892–1893 construction of a similar character in Brooklyn cost only $297,599 a mile, and doubtless the cost of duplication would now be still lower. The cost of the equipment is returned at $124,515 a mile, and some allowance should be made for damages to property owners; but making all possible allowances, it is evident that the value of the roads is due mainly to the franchise. The elevated railway is taxed in the same manner as street railways, the structure being assessed as real estate. For several years the Manhattan Company also paid to the city 5 per cent of the receipts of the Third and Ninth Avenue lines, as the New York Elevated Railroad Company had been required to do; but in 1894 the Court of Appeals relieved it from paying anything on the Third Avenue line and on the upper and newer portion of the Ninth Avenue line. The "Rapid Transit" Act of 1875 had provided that a com-

[1] Fifteenth Annual Report of Board of Railroad Commissioners, vol. ii., pp. 806–809.

pany might build connecting routes "with all the rights and with like effect as though the same had been a part of the original route;" but the court held that this had reference to powers only, and not to burdens.[1] The complicated state in which the court left the matter has necessitated so much accounting and additional litigation that it is not yet determined how much is due the city, and so of late years nothing has been paid.

IV. RAPID TRANSIT.

Plans for underground transit on Manhattan Island began to be seriously broached at about the same time that the first elevated road was begun; and a number of companies were organized and secured franchises for underground roads which were never built. In 1868 the New York City Central Underground Railway Company was incorporated to build a railway from City Hall Park under Mulberry Street and Fourth Avenue to Ninety-ninth Street, and thence in the open air to the Harlem River. In 1872 the Metropolitan Transit Company was created and empowered to build both an elevated and an underground railway on the west side of the city, for the most part through private property. The next year saw a

[1] Mayor, etc., of the City of New York *vs.* Manhattan Railway Co., 143 New York, 1.

charter for 100 years granted to the New York City Rapid Transit Company, organized by Cornelius Vanderbilt, for a tunnel railway under the Bowery and Third and Fourth Avenues. The Act declared this use of the streets to be a public purpose, and gave this as a reason for exacting no compensation for the franchise. The Broadway Underground Railway Company, also chartered originally in 1873 as the Beach Pneumatic Transit Company, was authorized the next year to build a railway under Broadway and Madison Avenue. Franchises for tunnels under the East and North Rivers also began to be granted before 1870.

The elevated railway system lessened for a time the demand for more rapid transit, but it was soon found to be quite inadequate; and again during the 80's projects for underground transit were brought forward by several corporations. The Rapid Transit Act of 1891 provided for the appointment of a Board of Rapid Transit Commissioners to determine whether it was for the interest of the public and of the city that a rapid-transit railway should be constructed, and if so to establish the route and plans of construction, obtain the necessary consents, and sell at auction the privilege of constructing the road and operating it for a term of years. That privilege was accordingly offered for sale at the end of 1892, the duration of the franchise being fixed at 999 years; but

there was only one bidder, who offered first $500 cash and one-half of one per cent of the receipts, and then $1,000 cash. The Commission rejected these bids, and decided to abandon the underground scheme in favor of some extension of the elevated system; but the following winter the situation was changed by a comprehensive revision of the Rapid Transit Act. A new Board of Commissioners was named, with duties similar to those of its predecessor; but after securing the necessary consents, it was to submit to popular vote the question whether the road should be constructed at public expense. In case of an affirmative vote, the Commission was directed to advertise for proposals, and enter into a contract with the best qualified person, firm, or corporation for the construction of the road for a certain sum of money, and its operation for a term of from 35 to 50 years, under the regulation of the Commission; otherwise, the privilege of constructing the road and operating it for a term of years was to be sold at auction as before. The referendum thus provided for resulted in an overwhelming majority for municipal construction, but the requisite consents of property owners could not be obtained; accordingly the General Term of the Supreme Court appointed three commissioners, who, after taking volumes of testimony and considering the question in all its phases, reported that the road ought to

be and could be constructed. But these commissioners considered it no part of their duty to determine the cost; and by reason of this omission the Appellate Division of the Supreme Court, to which the report was made under the new State constitution, refused to give its approval. The engineer of the Rapid Transit Commission had estimated the cost at less than $39,000,000, or, making liberal allowance for unexpected contingencies, not quite $50,000,000 at most. His estimate was based upon unit costs ascertained by numerous borings, was corroborated by the history of tunnel construction in London, Glasgow, Boston, Baltimore, and other cities, and of the excavations for the cable road in Broadway itself, and was further confirmed by six distinguished technical experts, as well as by practical business men who contemplated becoming interested in the contract. But engineers of existing local transit systems declared the estimate too low; and the court declared that "the disposition seems to be to enter upon this enterprise regardless of and in utter ignorance of the cost." The court also objected to the proposed road because it was not to extend to the city limits.[1]

Again it was thought necessary to give up the underground plan and resort to extending the

[1] Matter of Rapid Transit Commissioners, 5 App. Div., 290 (1896).

routes and increasing the carrying capacity of the elevated railway; but the public demand for the underground road was so strong that finally new plans were prepared so as to meet the court's objections. The original Broadway route, which was rendered very expensive by engineering difficulties, was largely abandoned. The new route was from the Battery to the Post-office under Broadway, thence under Park Row, New Elm Street, Lafayette Place, and Fourth Avenue to the Grand Central Station, thence by way of Forty-Second Street, Broadway, the Boulevard, and other streets to Kingsbridge, with a branch under One Hundred and Fourth Street, Central Park, and Lenox Avenue, crossing under the Harlem at One Hundred and Forty-fifth Street, and thence extending northeasterly to Bronx Park. There were to be four tracks from the Post-office to One Hundred and Fourth Street. The extreme northern portions of the road were to be on viaducts instead of underground, and this cheaper construction, together with other economies, made it possible to extend the tracks from two and one-half to four miles farther north than under the former plan. The total length of the new route was nearly 22 miles, and its cost was not to exceed $35,000,000. As in the original plan, sewers, water and gas pipes, and other conduits along part of the route were to be placed in galleries

easily accessible from the tunnel. These galleries were to remain in charge of the Rapid Transit Commission, and as new pipes were introduced they were to become a source of revenue.

The commission again failed to obtain the necessary consents of property-owners along portions of the new route, and again Supreme Court commissioners were appointed to determine whether the road ought to be built. These commissioners studied the financial aspects of the problem, and were able to report that the road could be built well within the estimate of the Rapid Transit Commission, and that the earnings would undoubtedly be sufficient to pay all expenses and debt charges. They also declared the undertaking to be absolutely necessary and legally possible. The Appellate Division of the Supreme Court agreed with its commissioners that the proposed road was an "imperious necessity," and confirmed their report; but it made it a condition of its consent that a bond of $15,000,000 should be required of the contractor. The corporations which had been organized to bid for the contract were discouraged by the requirement of this excessive bond; yet the Metropolitan Street Railway Company might have undertaken the work, had it not been for the unfriendly attitude of the new city administration toward the rapid transit project. The court's decision was criticised not only on grounds of public

policy, but also because the Rapid Transit Act left the conditions of the contract to be fixed by the Rapid Transit Commission; but the Appellate Division cited the case of the Broadway Surface road as a precedent for its assumption of power, and refused to modify its requirement except by permitting a reduction of the bond to $1,000,000 after the completion of the road.[1] Once more the Rapid Transit Commission was obliged to resort to negotiations with the Manhattan Railway Company, looking to extensions of the elevated road; but it was found impossible to agree upon terms.

The city has authority to issue bonds to the extent of $55,000,000, bearing not more than 3½ per cent interest, to pay for the construction of the Rapid Transit road and the acquisition of necessary property and easements. If a contract should still be let under the present law, the contractor will be required to pay, as rental for the use of the road when completed, the interest and at least 1 per cent additional upon the cost of construction, including the price of lands acquired in fee; but the Rapid Transit Commission may in its discretion waive the payment of the additional 1 per cent for the first five years, and reduce it one-half the second five years, unless the contractor's profits exceed 5 per cent during the first period or 5½

[1] Matter of Rapid Transit R.R. Comrs., 26 App. Div., 608 (March, 1898).

per cent during the second. After providing for the interest on the bonds, the remainder of the rental will be paid into the sinking fund of the city. It is announced, however, that this law will be amended.

The constitutionality of the Rapid Transit Act has been affirmed by the Court of Appeals, in a suit brought by a newspaper corporation which had failed to defeat the project in its own paper. It was contended that the Rapid Transit Act was socialistic, and that it violated the provisions of the State constitution prohibiting cities from incurring indebtedness for other than city purposes, or loaning their property or credit; for it was claimed that city purposes did not include the building of rapid-transit railways, and that leasing a municipal railway to a private corporation would be in effect loaning the city's credit. There was little to support these contentions, especially as the municipal construction of the bridge and railway across the East River had been upheld by the Court of Appeals against very similar objections; and that court now declared that railroads, like common highways, were public in character, and when constructed by a city were for a city purpose.[1]

[1] Sun Printing and Publishing Association *vs.* the Mayor, etc., of the City of New York, 152 N.Y., 257 (March, 1897).

V. THE BROOKLYN BRIDGES.

A bridge over the East River is said to have been first seriously proposed in 1811; but no legal provision was made for such a structure until 1867. In that year the New York Bridge Company was incorporated by Act of the Legislature; and the cities of New York and Brooklyn were empowered to subscribe to its capital stock by vote of two-thirds of the Council in either case, and to issue bonds in payment. The Act also authorized the two cities or either of them to purchase the bridge at any time by paying the cost and one-third additional. Two years later, both municipalities having subscribed to the stock, the Mayor, Comptroller, and President of the Board of Aldermen in New York and the Commissioners of the Sinking Fund in Brooklyn were made directors of the company, which thus became almost at the beginning something more than a private corporation. In 1874 and the following year, the company having failed to make satisfactory progress with the bridge, the two cities were empowered to buy out the private stockholders, the company was dissolved, and the bridge was declared a public work. The expense of construction was assumed by the two cities jointly, Brooklyn paying two-thirds of the amount; and the management of the bridge was turned over to eight trustees from each city, together with the

two mayors and comptrollers acting as trustees *ex officio*. This Board of Trustees was empowered either to operate a railway over the bridge or to delegate its operation to others, and chose the former alternative.

When the bridge was opened to traffic in 1883, there was a charge of one cent for admission to the promenade; but in 1885 this was reduced to one-fifth of a cent when tickets were bought, and in 1891 the bridge was made entirely free to pedestrians. After the first year and a half the tolls for horses and vehicles were reduced 40 and 50 per cent; the carriage-ways were made free to bicycles in 1896; and the following year the Legislature authorized the abolition of all carriage-way tolls, which would have left no tolls whatever except those on the railway; but this authority has not been exercised. The railway fare was reduced in 1885 from the original 5 cents to 3, or 2½ when tickets were bought in packages of ten; and since 1894 purchasers of only two tickets at a time have had the advantage of the lowest rate. Thus there has been a consistent policy of reduction of tolls, in striking contrast with the maintenance of the original fares by the street railways. Notwithstanding these successive reductions, or rather partly because of them, the annual receipts of the bridge from tolls of all kinds gradually increased from about half a million dollars the first year or

two to about a million and a quarter. The total receipts during the fiscal year 1897 were $1,363,-731, including $1,150,064 in railway fares, $90,-797 in carriage-way tolls, $87,039 in rentals from leased arches and other spaces, and $24,380 for the use of the bridge as a support for telegraph and telephone wires. After paying all expenses, including many items more properly chargeable to capital account, there has frequently been a so-called surplus equal to 3 per cent or more of the original cost of more than $16,000,000, to be paid into the sinking-funds of the two cities, — two-thirds to Brooklyn and one-third to New York. This surplus revenue was $540,000 in 1894, and $510,000 in 1895, but fell to $210,000 in 1896; no surplus was divided during the fiscal year 1897, but the receipts exceeded the expenditures by $135,588.

When the railway fare was cut in two in 1885 the traffic at once more than doubled; and the receipts, instead of falling off, were considerably increased.[1] What is more surprising, there was at the same time no increase in operating expenses of the bridge as a whole, but a slight decrease. The operating expenses of the railway itself are not separately reported, but they undoubtedly comprise all the large items.

The management of the bridge and the bridge railway, as compared with that of the elevated and

[1] Report of the Trustees, 1885, pp. 4-10.

surface roads in the two cities, has been on the whole remarkably good. The trustees have been subjected to much newspaper criticism, especially in connection with some temporary inconvenience attending the recent improvement of terminal facilities; but this seems to be only an illustration of the principle that public corporations are more closely watched than private ones, and so is rather an argument for than against municipal management. In the fourteen years during which the bridge railway has been in operation, often in the midst of dense fogs, there has been only one fatal accident; but it is noticeable that whenever a break-down occurs it occasions much more remark than a similar mishap on the elevated railway. The work of the bridge trustees has been on the whole rather a triumph for municipal operation and low charges.

One great inconvenience of the bridge railway in the past, though borne with little complaint by the public, has been the necessity of changing cars at both ends for destinations at any distance from the bridge. This has now been obviated in large measure by terminal facilities permitting the Brooklyn surface and elevated railways to run their cars over the bridge. They are not permitted to collect any additional fare; and in consideration of this condition the compensation for the use of the bridge and tracks has been fixed at the very low rate of 12½

cents for each elevated railway car and 5 cents for each surface car, — a needlessly great sacrifice of revenue, it would seem, however desirable the innovation. This improvement has been carried to completion not by the Trustees of the New York and Brooklyn Bridge, who began it, but under the auspices of the Department of Bridges of the City of New York; for with the union of the cities the joint board of trustees has ceased to exist, and its powers are vested in the Commissioner of Bridges and in the Municipal Assembly.

The preliminary history of the second East River Bridge, which is to connect Grand Street in Manhattan with Broadway in Brooklyn, is similar in its main outlines to that of the original Brooklyn Bridge. At first the franchise was granted to the East River Bridge Company; but after this company had exceeded the time allowed it for beginning work, its rights were purchased on behalf of the two cities by the East River Bridge Commissioners, appointed under an Act of 1895, who have begun the construction of the piers. The management of the bridge when completed was to have been turned over to the trustees of the first Brooklyn Bridge, but in 1896 its future management was intrusted to the Commissioners in charge of its construction; and the new charter makes an exception in their favor and leaves their powers undiminished. The proposed bridge across the North

River is to be the property of a private corporation, unless, indeed, the history of the Brooklyn bridges again repeats itself. Various tunnels between Brooklyn, Manhattan, and Jersey City are also projected by more or less substantial corporations, one of which has even carried its excavations most of the necessary distance under the North River, but lacks the capital necessary to finish it.

VI. WATER, GAS, AND ELECTRICITY.

The excellent water supply of the lesser New York City was under the management of the Department of Public Works; the new charter creates a Department of Water Supply, with a Commissioner at its head. The Croton Aqueduct Commission, which still controls the aqueduct, will go out of existence at the end of the century. Although the expense of aqueduct construction was very great, the net revenue from the water service is much more than sufficient to pay the interest on the bonds, and the debt is gradually disappearing.[1] The charges for water, locally known as "water rents," together with fees for tapping mains, amounted in 1896 to $4,144,057. Commissioner Collis, in the report of his department for that year, described the situation as follows: —

[1] *Cf.* Durand, "Finances of New York City," p. 226.

"For the first time in the history of the city the revenue carefully collected from water rents is more than enough to reimburse the entire outlay of the Public Works Department which is taken from taxation; that is to say, our water rents pay for repairs to pavements, street lighting, care and repairs of the entire water system, care and repairs of public buildings, all salaries and wages, and all other administrative expenditure; and all this in the face of the fact that our people consume 110 gallons per capita per day, whereas in London they are limited to 25 gallons per day."

The receipts for 1897 were $4,322,226. The running expenses are difficult to ascertain accurately, but are estimated in round numbers at $1,000,000 a year. Allowance should be made for the fact that charitable institutions are supplied with water free of charge, to say nothing of that used by the various city departments.

Whatever measure of success the city has had with its transit problem and its municipal undertakings, it has been much less fortunate in dealing with its lighting monopolies. The gas companies have usually obtained their franchises for the asking, and practically no revenue has been derived from this source. Nor is there any very satisfactory regulation of the companies, though public inspection of meters is provided for at their expense. For the rest, the Legislature has clung persistently to its belief in competition as a regulator, and has been reluctant even to reduce the

price of gas. This attitude was strikingly shown in 1886, two years after the formation of the Consolidated Gas Company with great watering of stock, by the passage of "an Act to facilitate the supply of illuminating gas in the city of New York at a reasonable price," which simply incorporated the Standard Gas Light Company, authorized it to lay pipes under all the streets of the city and charge $1.50 a thousand feet for gas, and forbade it to unite or pool receipts or earnings with any other gas company. The prevailing price at this time was $1.75; but another Act of the same year reduced it to $1.25 for all companies, legislative investigation having shown that the profits of the business were excessive;[1] while a third Act applied the prohibition of combinations and agreements to all companies thereafter organized, and limited their dividends to 10 per cent of the capital actually paid in, but, following the English plan, allowed an additional 1 per cent for every 5-cent reduction of the price below $1.25. Consolidation had been forbidden in 1866 in the case of the Mutual Gas Light Company, and made a misdemeanor on the part of the directors. The mutual feature of this charter provided that when the profits should exceed 10 per cent one-half the excess should be divided among the consumers in

[1] Senate Document No. 41, 1885, quoted at length by Bemis, "Municipal Ownership of Gas in the United States," pp. 70–76.

proportion to the amount consumed, and one-half distributed as dividends among the stockholders who were also consumers; but the dividends are easily kept below 10 per cent.

For eleven years the price of gas was maintained at $1.25, with the result that in New York the use of gas for fuel is still considered an expensive luxury. In 1897 a bill to reduce the price to $1 was introduced and pushed vigorously in the Legislature, but the companies were able to secure the substitution of a measure reducing the price only 5 cents at first, with a further reduction of 5 cents a year for four years. The yearly contract prices for public street-lighting range from $12 to $28 a lamp for three-foot burners, averaging more than the $15 paid the Manhattan Gas Light Company in 1833 for burners of the same size. When gas was first introduced in 1823, the New York Gas Light Company was required to light the streets at an expense to the city not exceeding that of an equal number of oil lamps. The gas franchises of this early period were granted for terms of from fifteen to thirty years, but this prudent custom soon fell into disuse. The period for which a gas company may be incorporated is limited to fifty years; but according to the decision in the Broadway Surface Railroad case,[1] this does not necessarily limit the franchise given by the city.

[1] People *vs.* O'Brien, 111 N.Y., 1.

Some small amounts have been received in recent years from the Equitable Gas Light Company, by reason of a provision of its franchise which required it to pay 20 cents for each foot of main laid. The East River Gas Company of Long Island City, which has recently begun to supply gas to Manhattan through mains under the river, is required to pay 3 per cent of its gross receipts from this source. In 1897 this company paid $21,739, and the Equitable $1,634. The gas companies are taxed in the same manner as street railways, except that the tax on gross earnings is only one-half as great.

What has been said of the gas companies applies also, as far as the treasury is concerned, to electric lighting companies and other corporations using electricity. The regulation of these companies, however, requires separate mention, being chiefly concerned thus far with placing the wires underground, and diminishing as far as possible the danger from those remaining above the surface. An act of 1884 ordered all telegraph, telephone, and electric-light wires placed underground; and the next year the administration of the law was intrusted to a Board of Commissioners of Electrical Subways, which was afterward designated the Board of Electrical Control and given the assistance of the Mayor and the Commissioner of Public Works. The companies affected first ignored

the law and then applied to the courts for relief, declaring the operation of their wires underground to be an utter impossibility; but the courts finally refused to grant the desired immunity. The subways have been constructed under the direction of the Board of Electrical Control by two companies, which are required to rent space on equal terms to all authorized parties applying therefor, and to pay into the city treasury any excess of average profits above 10 per cent; but the Commissioners of the Sinking Fund have discretionary power to purchase the subways at such price as may be agreed upon, not exceeding ten per cent more than the cost of construction. The Board of Electrical Control was a temporary body, whose work is now finished; and its functions, with those of the Brooklyn Commissioners of Electrical Subways, are devolved upon the Commissioner of Public Buildings, Lighting and Supplies.

VII. CONCLUSION.

In the city's dealings with the ferry companies several important principles have been evolved, chief among which are the sale of franchises for short terms to the highest bidders, the fixing of upset prices according to the value of each franchise, the acquisition of the necessary property by new lessees at appraised valuations, the exercise

by the Legislature of the right to reduce fares, and the reservation by the city of minute powers of regulation. The auction principle has been applied to street railways only in a very imperfect manner, and without limit as to the duration of franchises. By the charter of Greater New York, however, the situation as to street railways is exactly reversed; for while the provision requiring auction sales seems to be repealed, it is provided that "no franchise or right to use the streets, avenues, parkways or highways of the city shall be granted . . . for a longer period than twenty-five years," though any such grant may provide for renewals at fair revaluations, not exceeding twenty-five years in the aggregate. At the expiration of a franchise the plant is to become the property of the city, either without compensation or at a fair valuation of the tangible property, as may be provided in the original grant. When the city acquires a plant without compensation it may either operate it or lease it for not more than twenty years to the former grantee or others; but, curiously enough, if the city pays for the plant, it must itself operate it for at least five years, after which it may determine either to continue municipal operation or to lease the property for limited periods as it does ferries and docks. It is also provided that every grant shall make adequate provision for efficient service at reasonable rates, and

for the maintenance of the property in good condition. All franchises, including extensions and renewals, are to be granted by ordinance after due publication of all the terms and conditions, including the rates of fare or other charges; and at least thirty days must intervene between the introduction and final passage of such ordinances. The plan of public sale of franchises is replaced by the requirement that no franchise shall be granted except on terms approved by the Board of Estimate and Apportionment, after an inquiry into the value of the franchise and the adequacy of the proposed compensation. Every ordinance granting a franchise must receive the votes of three-fourths of all the members elected to each branch of the Municipal Assembly, or five-sixths in case of a veto by the Mayor.

The requirement of these extraordinary majorities is an interesting experiment, but it would not have been sufficient to prevent the Broadway franchise steal. A rather more valuable provision, if one may judge of the future by the past, is that giving to the Board of Estimate and Apportionment the duty of investigation and the power of absolute veto; for this definitely fixes the responsibility upon five men. This particular board was chosen for the purpose doubtless because it is the body charged with making both ends meet in the municipal economy, and so may naturally be expected

to have a particular interest in obtaining the greatest possible financial return for every franchise. On the other hand, this board has no especial interest in securing reductions of fares or other charges except to the extent that they would increase instead of diminishing the receipts upon which percentages are paid. While the Board of Estimate and Apportionment may usually be trusted to look out fairly well for the fiscal interests of the city and the relief of the taxpayers, the multitudes who pay tribute to the franchise-holding corporations must look for relief mainly to the Municipal Assembly, which, if uncorrupt and fairly representative, will have a natural tendency to reduce the charges whenever it may justly be done.

One great defect in this new procedure is that without the expedient of the competitive sale the Board of Estimate and Apportionment has no means of determining the value of a given franchise, which depends upon a great variety of circumstances. The charter fails to prescribe the mode in which the board is to conduct its inquiries. When the franchise in question is a renewal of a previous grant, and the charges and other conditions are to remain the same as before, its value may be ascertained with some degree of accuracy by examining the accounts of the company whose grant is expiring, as the Comptroller

has authority to do; but it is not always possible to ascertain the value of the grant in this manner, and in the case of a new franchise or a renewal under greatly changed conditions, this recourse is lacking altogether. No one can tell the value of a new franchise so well as those who apply for it; and it is only when they are bidding against each other that they will disclose their real opinions on the subject. The most obvious plan, therefore, if the board really wishes to secure the best possible terms for the city, is to depend in large part upon the offers of rival companies to indicate the value of new franchises; and these offers might even be received at public hearings which would really be auction sales in everything but name, for there is nothing in the charter to prevent the holding of such informal auctions. It must of course be remembered that competition of this kind is not effective in all cases. So long as the Board of Estimate and Apportionment is incorruptible and vigilant in the public interest, there is no reason why the provisions of the new charter should not work well; their chief fault is that there is nothing to prevent a weak or dishonest city government from giving away franchises almost as freely as ever. The provision of the General Railroad Law requiring street railways to pay at least three per cent of their receipts, and five per cent after the first five years, still remains in force; but there

is no corresponding requirement concerning other classes of corporations.

Whether the precautions now thrown about the granting of franchises are more or less effective than the provisions of the Cantor Act, the general limitation of the franchise period to twenty-five years marks a great advance; for now if valuable franchises are granted for nothing, or for the least compensation allowed by law, the evil will not always be irreparable; no city government, however weak or corrupt, can make its grants binding upon future generations. So as between the old plan of granting perpetual franchises, even at auction, and the new plan of granting them for limited periods, without express provision for competition, the new plan will be the better in the long run. For at some future time, when the people shall have triumphed in their revolt against the bosses, as soon, in short, as the people become thoroughly tired of being robbed, the prices of franchises will begin to approximate their actual value; and none granted under the new charter will escape revaluation. At first thought the restrictions of the new charter seem much like locking the stable door after the horse is stolen; yet, even though so much has been disposed of already, there is really much remaining to excite the ambitions of promoters in the future. As electricity replaces the more primitive sources of light, heat,

and power, there will be need for more electrical conduits, and those already laid will yield such profits that the city may begin to get its share; or if compressed air should turn out to be the marvel of the twentieth century, the demand for air-tubes under the pavements would be vastly increased. Already there are eager applicants for the privilege of supplying fuel-gas to the housekeepers of Greater New York; for the older and lesser New York, thanks to dollar-and-a-quarter gas, has been so behind the times as scarcely to know any better fuel than coal. Again, the modernization of the surface railways is in progress in Manhattan; and as Mr. Low pointed out in accepting the nomination for Mayor, every consent to a change of power should be treated as a new franchise. There is some danger that the people of this old-fashioned borough, whose only choice in the past has been between the plodding horse-cars, the inconvenient and overcrowded "L," and the jerky cable, will welcome the smoothly-running "underground trolley" with such delight that they will overlook its advantages from the company's standpoint. It is indeed the most nearly perfect system of surface traction in use; but it is also an economical system — very economical as compared with horses — and its introduction might well be taken advantage of to undo in some measure the mistakes of the past. Thus might the march of invention be made

to aid the growth of population in increasing the rentals of the surface as well as the subways of the city streets.

In conclusion, it may be said that the public nature of transit monopolies has been fairly well recognized by the statute laws of New York, not only in permitting municipal construction of the East River bridges and the Rapid Transit Railway after unsuccessful attempts to get them built by private enterprise, but by the public sale of franchises, by the appointment of commissioners to adopt plans for new modes of transit, by giving to Supreme Court commissioners power to override the wishes of property-owners in the public interest, and by the supervisory powers of the State Railroad Commission and various municipal authorities. But the principles which made the old New York more successful than most American cities in dealing with transit franchises were never applied to gas or electric monopolies until the charter of the greater city was adopted. In respect to the manner of granting franchises, all classes of corporations hereafter applying for the use of the streets are placed on an equal footing by this instrument, in which "the rights of the city in and to its water front, ferries, wharf property, land under water, public buildings, wharves, docks, streets, avenues, parks, and all other public places are . . . declared to be inalienable."

VI.

THE LEGAL ASPECTS OF MONOPOLY.

THE LEGAL ASPECTS OF MONOPOLY.

By Professor FRANK PARSONS.

In dealing with the public ownership or control of roads, bridges, and canals, parks, ferries, and wharves, water, gas, and electric plants, street railways, telegraph and telephone systems, etc., etc., various questions of law arise, a definite comprehension of which is necessary to a clear understanding of the relations of the public to business enterprises. Some of the principal subjects under this head are as follows: —

1. The right of cities and towns to engage in business.

2. The right of the public to enter into competition with private enterprise.

3. The right of the public to take private property, and the compensation that must be paid.

4. The right of the public to prevent the use of injurious methods in business.

5. The right of the public to regulate rates and service in lines of business affected with a public interest.

I. AUTHORITY.

The Right of Cities and Towns to Engage in Business.

In order to determine whether a city or town has the legal right to engage in a specified business two questions must be answered: (*a*), Is the purpose a public one? and (*b*), Has the Legislature or the Constitution authorized such action on the part of the municipality?

(*a*) The first question is a judicial one. The fundamental principles of justice inherent in the very nature of free government, whether expressed in its Constitution or not, forbid taxation for private purposes. A government enterprise requires or may require taxation; wherefore government enterprise must relate to a public purpose.[1]

The government cannot take the property of A in order to make it a gift to B, nor engage in business for the service of one or two individuals or a small class of individuals.[2] The government is an agent of the public, and must not use its power and machinery for the benefit of any other principal.

[1] Loan Association *vs.* Topeka, 20 Wallace, 664 U. S. Supreme Court; Weismer *vs.* Douglas, 64 N. Y., 92, 98–99; Opinion of Justices, 58 Me., 590. Judge Cooley on Taxation, p. 116.

[2] Judge Dillon in Hanson *vs.* Vernon, 27 Ia., at 51; see also 25 Ia., 540; 164 U. S., 403; Cooley on Taxation, chap. iv.; Parsons's "Blackwell," §§ 33, 35; Sedgwick on "Constitutional Law," 155.

It has been held that roads, bridges, sidewalks, sewers, ferries, markets, scales, wharves, canals, parks, baths, schools, libraries, museums, hospitals, lodging-houses, poor-houses, jails, cemeteries, prevention of fire, supply of water, gas, electricity, heat, power, transportation, telegraph and telephone service, clocks, skating-rinks, musical entertainments, exhibitions of fireworks, tobacco warehouses, employment offices, etc., are public purposes, and proper subjects of governmental ownership.[1]

On running through the cases to find, if possible, a common ground of decision, it appears that whatever is of general utility or convenience to the community constitutes a public purpose. There is an opinion by a Massachusetts court[2] in which the majority of the court affirm that the sale of coal and wood is not a public purpose, and that cities and towns cannot be authorized by the Legislature to open municipal fuel-yards. The court said that constitutional questions, such as

[1] See Cooley on Taxation and cases cited. A municipality may be authorized to build and own a street railway; such railway serves a public purpose. Sun Printing and Pub. Assoc. *vs.* New York, 46 N. E. Rep., 499, April 9, 1897. Cities and towns may be authorized to establish and operate gas and electric light works, New Orleans Gas Light Co. *vs.* La. Light Co., 115 U. S., 659, 670, 683. Opinions of Justices, 150 Mass., 592. Citizens' Gas Light Co. *vs.* Wakefield, 161 Mass., 432. Crescent City Gas Light Co. *vs.* New Orleans Gas Light Co., 27 La. An., 138, 147.

[2] Opinion of Justices, 155 Mass., 601.

this one, of the nature of a public purpose, were largely questions of history and usage; and it had not been usual for cities and towns to supply their inhabitants with fuel unless they were paupers, nor to engage in anything of the nature of what is commonly called trade or commercial business. "We know of no instance of this being done," says the court, "except by the town of Boston." In 1713 and 1714 Boston, fearing a scarcity of food, voted to lay in a stock of grain to the amount of 5,000 bushels of corn. Afterward the town regularly bought and stored grain, and sold it to the inhabitants every year until 1775, and perhaps later. The court remarked that the nearest analogy was the manufacture and sale of gas and electric light, and that the decision in that case rested on the ground of the *general convenience* of the service, the *impracticability* of each individual's rendering the service for himself, and the *necessity of using the streets* in a special way, or *exercising the rights of eminent domain;* whereas the buying and selling of coal and wood does not require a special use of the streets, nor the right of eminent domain, nor the exercise of any other franchise or authority derived from the Legislature.

It is true that in dealing with sewers, water, gas, and electric works, etc., courts have sought to strengthen their conclusions by reference to the necessity of a special use of the streets or other

action requiring legislative authority; but they did not decide that a purpose could not be a public one without this element: on the contrary, schools, libraries, museums, lodging-houses, hospitals, baths, scales, markets, etc., do not require any special use of the streets nor any franchise or right of eminent domain, but can be established by any one without legislative authority. As to impracticability, it is as impracticable for each individual to establish a coal-yard, and get coal from the mines at reasonable rates, as it would be for each individual to supply himself with schools, libraries, baths, hay-scales, etc.

The real gist of the opinion seems to reside in the following sentences: —

> "Buying and selling coal does not differ essentially from the business of buying and selling any other of the necessaries of life. . . . We are not aware of any necessity why cities and towns should undertake this form of business any more than many others which have always been conducted by private enterprise."

The court considered it against public policy to open the door for municipalities to engage in ordinary business in competition with private parties. That, however, is a very different matter from the question whether or not the purpose is a public one. The two questions should not have been confused with each other. If the purpose is a public one, the question whether it is necessary

or wise to undertake it, is a question for each municipality to decide for itself, and is a matter entirely outside the jurisdiction of the court.

In a strong dissenting opinion Judge Oliver Wendell Holmes says: —

"I am of opinion that when money is taken to enable a public body to offer to the public without discrimination an article of general necessity, the purpose is no less public when that article is wood or coal than when it is water or gas or electricity or education, to say nothing of cases like the support of paupers, or the taking of land for railroads or public markets."

(*b*) Let us turn now to the second question, the legal authority of the municipality to engage in any given business or undertaking.

In Germany the rule is that municipalities may establish all sorts of institutions and engage in all sorts of enterprises that can further the material or intellectual welfare of their citizens; and in France the municipal council may act in local affairs without state approval, except where this is expressly required by law.[1] In England and the United States, on the contrary, a municipality can do nothing without the permission of the state.[2]

[1] Prof. F. J. Goodnow, in Pubs. of Amer. Econ. Assoc., vol. ii., p. 574.

[2] Dillon on Municipal Corporations, 4th Ed., § 89. Parsons on Municipal Liberty, *Boston Law Magazine*, May, 1897. There is usually in municipal charters a broad power to make "police

In some cases authority is granted by constitutional provision. For example, the Kentucky Constitution (1891) provides that each town and city shall have the right to say whether or not a street-railway, gas, water, steam-heating, telephone, or electric-light company shall build in its streets, the municipal franchise not to exceed twenty years, and to be sold to the highest bidder. The Constitution of South Carolina (1895) prohibits the organization of cities or towns without consent of the citizens, and provides against the grant of any right to construct or operate any street-railway, telegraph, telephone, water, gas, or electric-light plant without consent of the local authorities. More or less similar provisions are found in the constitu-

regulations" or to act for the "safety, order, and welfare of the community," or "to direct and manage its prudential affairs; preserve the peace and good order, and maintain the internal police thereof." This power to provide for the comfort, health, convenience, good order, and general welfare of the people, is called the "police power" (Dillon, § 141), and from it municipalities may derive authority to establish fire-departments, suppress nuisances, build and control markets, construct and operate waterworks, light the streets, etc., without express and specific legislative action on these special matters. (Dillon, §§ 143, 146, 380.) The general tendency of the courts, however, is to construe municipal charters strictly, and confine them to such powers as are specifically enumerated or necessarily implied or clearly established by usage as fair derivatives from the general clauses (Dillon, §§ 30, 89, 91, 92). The powers conferred on a municipal corporation may at any time be altered or repealed by the Legislature, either by a general law, or, in the absence of constitutional restriction, by a special act. (Dillon, § 85; 102 U. S., 472; 74 N.Y., 161; 106 Ill. 237.)

tions of several other States, but the South Carolina Charter of Liberty contains another provision that is not so easy to parallel; it is a constitutional authority for any city or town to build or buy water-works or lighting-plants, and supply their inhabitants, on a vote of the people to that effect.

In one State there is a statute, and in four other States there are constitutional provisions, conferring on municipalities the right of making their own charters.[1] This makes the field of municipal power about the same as under the German rule, as a municipality may adopt a charter that will give it entire freedom of action so long as it does not do what the State or nation has forbidden.

In the absence of constitutional authority a municipality in America can do nothing without the permission of the Legislature. Cities and towns are creatures of the Legislature, and entirely at its mercy. Even the powers it grants them may be

[1] In Missouri cities of more than 100,000 population may make their own charters. In Washington cities of 20,000 or more; in California cities of 3,500 or more; and in Minnesota all municipalities may do this. In these States the right under consideration is secured by constitutional provision. The first provision of this sort was passed by Missouri in 1875, California and Washington quickly followed. Minnesota has just wheeled into line. St. Louis, Kansas City, San Francisco, Sacramento, San Diego, Los Angeles, Seattle, Tacoma, and a number of other cities, have availed themselves of the new right. By a Louisiana statute of 1896, any city or town in that State (except New Orleans) may adopt a charter of its own. For a more extended treatment of this subject, see Parsons on "The Rights of Cities," Equity Series, No. 2, C. F. Taylor, Philadelphia.

revoked at any time. A legislative authority to build an electric-light plant, for example, or own and operate a ferry, gas-plant, water-works, railway system, or telephone exchange is revocable if the grant is made to a municipal corporation, but is not revocable if granted to a private corporation, unless the right to repeal is expressly reserved. A grant to an association of citizens called a company is a contract protected by the clause of the Federal Constitution which forbids a State to pass any law impairing the obligation of contracts; but a grant of the very same nature to an association of citizens called a city is not a contract, and is not protected by the National Constitution.[1] *Why* it is not a contract is simply because the courts have so decided in order to carry out the doctrine that municipalities are absolutely subject to the legislative will,[2] a doctrine which itself rests upon a confusion of thought. There *is* good reason for holding municipalities subject to the Legislature in respect to the administration of justice, arrest of criminals, proceedings in court, election regulations, and other

[1] East Hartford *vs.* Hartford Bridge Co., 10 How. (U. S.), 511; Roper *vs.* McWhorter, 77 Va., 214: compare Benson *vs.* Mayor, 10 Barb., 223.

[2] The reason sometimes given for holding a municipal charter not to be a contract is that public corporations are "created by the mere will of the Legislature, there being no other party interested or concerned" (Cooley in Const. Lims., p. 336, note; 11 Ired., 558, 561). This is manifestly false ground, since the citizens of a city constitute a second party in interest quite as truly as the stockholders of a private corporation.

matters pertaining to political and governmental functions in respect to which uniformity is desirable throughout the State; but there is no reason for compelling a city or town to consult all the other cities and towns in the State in order to find out if it may be allowed to construct a local gas-plant, or water system, or telephone exchange. State interests should be governed by the State, but local business should be controlled by the municipality; at least it should be so if the principle of self-government is a valid one. That principle requires that each individual and group should be free to govern its own affairs without interference, except so far as the government of large interests by the large groups necessarily interferes with the government of small interests in the included groups. National government of national interests, State government of State interests, municipal government of municipal interests, and individual government of individual interests — that is the law of liberty and self-government; and it affirms that a State has no more right to impose its judgment on a city or town in respect to its local business affairs [1] than the nation has to impose its judgment

[1] There is a clear distinction between the governmental and the business functions of a municipality. In respect to the former, it acts as an agent of the State. In respect to the latter, it bears the same relation to the State as a private corporation. Its waterworks, parks, markets, hospitals, libraries, etc., it holds for the benefit of its citizens, and not as an agent of the State; and the

on a State in respect to State affairs. For the most part, however, this line of reasoning, clear as it is, has not been recognized on this side of the water; and our cities are subject to a State paternalism so severe that a city of half a million people may not connect two public buildings with an electric wire,[1] except by legislative permission; and it is even lawful for the Legislature to provide for the appointment of State agents to take the management of municipal business entirely out of the hands of the municipality.[2] It is lawful also for

Legislature cannot take away this tangible property without compensation, although it may annul the franchise without payment, and may even destroy the municipality itself. See Mt. Hope Cemetery *vs.* Boston, 158 Mass., 509; People *vs.* Ingersoll, 58 N.Y., 1; Montpelier *vs.* East Montpelier, 29 Vt., 12.

[1] A little while ago the city of Boston wished to run a wire from the City Hall to the Old Court House, either over or under the little back street 50 or 60 feet wide that lies between the two buildings. The object was to enable the city to light the Old Court House from the dynamo in City Hall. A bill was introduced for the purpose, accompanied by petition of the mayor of Boston (House Bill No. 747, 1898); but the electric companies did not wish municipalities to use a dynamo in a public building to operate lights outside of the building, and the Legislature refused to pass the bill, and Boston cannot run a wire between two of her own buildings over or under her own street.

[2] In 1870 the Pennsylvania Legislature appointed a commission to erect city buildings at Broad and Market Streets in Philadelphia, and required the city to pay for the work, although she had nothing to say about it. (Perkins *vs.* Slack, 86 Pa. St., 283; Dillon, § 74a; Hare's Am. Const. Law, vol. i., p. 630.) Suppose the Legislature should say, "Mr. Jones, you are able to build a marble mansion. We'll have it built for you to suit our taste, and you can pay for it." The courts would not allow such imposition on a single individual; but a million individuals in the shape of a

the Legislature to create or destroy municipalities at will.[1]

The weight of legal authority is certainly in favor of the doctrine of almost absolute legislative power over municipalities. Yet the argument for local self-government, or municipal independence in respect to local affairs, is not without strong recognition in the opinions of some of our ablest judges. Judge Cooley said: "The doctrine that the powers and rights of municipalities are wholly at the legislative disposal is dangerous in government, and, as we think, unsound in constitutional law."[2] And the Supreme Court of Michigan held that the Legislature could not construct parks for the city of Detroit without its consent,

municipality are helpless against the Legislature, because of the weight of some old ill-digested precedents, and the Pennsylvania Act is held constitutional. (See Perkins *vs.* Slack, *supra.*) So is an Ohio statute authorizing the governor to appoint officers to act on boards of public works in cities. (State *vs.* Smith, 44 Ohio St., 348.) The water-works of a city may be taken from its control, and put under the management of a board of commissioners appointed by the State. (Coyle *vs.* McIntire, 7 Houst (Del.), 44.)

There is authority for the proposition that all the property and all the rights and powers of a municipality are at the absolute disposal of the Legislature. (Darlington *vs.* Mayor, 31 N.Y., 164.)

[1] Meriwether *vs.* Garrett, 102 U.S., 472, 511, Dillon, §§ 54, 64, and cases cited. Imagine Congress passing an Act to annex Delaware and Maryland to Pennsylvania, or divide New York into three or four States, without consulting the people concerned. Yet similar things may be done by a legislature with cities of more importance than some of the States. Montpelier *vs.* East Montpelier, 29 Vt., 12.

[2] Cooley on Taxation, p. 687.

nor appoint State officers to control a city's public works, the right to local self-government of local affairs being inherent in the American system, a part of the fundamental law underlying and antedating our constitutions, and existing independently of any express provision on the subject.[1]

Legislative control of municipalities has been limited in a number of States by constitutional provisions forbidding local or special legislation [2] in reference to streets, franchises, granting of corporate powers, regulating internal municipal affairs, creating, amending, or repealing municipal charters, etc. The power to divide cities into classes, and legislate for each class, neutralizes these provisions to a considerable extent, and the range of legislative interference with the internal business of municipalities is still very great.

At present a large part of the statutes passed by our State legislatures each year consists of local laws dealing with matters that should be left to municipal discretion.

[1] People *vs.* Hurlbut, 24 Mich., 44, and People *vs.* Detroit, 28 Mich., 228, Judge Cooley delivering the opinion of the court. See also State *vs.* Denny, 118 Ind., 382, and Evansville *vs.* State, 118 Ind., 426, adopting the same view. See also People *vs.* Lynch, 51 Cal., 15, and Schumacher *vs.* Toberman, 56 Cal., 508. See, however, Commonwealth *vs.* Plaisted, 148 Mass., 375, repudiating the principle of the text.

[2] Pennsylvania, New Jersey, Illinois, Missouri, Minnesota, Nebraska, Louisiana, Texas, Mississippi, Kentucky, Montana, Idaho, Colorado, Wyoming, Washington, and California have the fullest provisions of the sort referred to in the text.

Governor Russell of Massachusetts called emphatic attention to this in his address to the Legislature in 1891, and again in 1892 and 1893. He advocated a large extension of the rights of cities and towns, not only as justice to them, but as a needed relief to the Legislature. He said that in 1892 about one-third of the 440 Acts of the Massachusetts Legislature were special laws passed on the application of 25 cities and 85 towns in reference to matters of local business. The Fassett Committee, appointed in 1890 by the New York Senate to investigate municipal government in that State, found that in the six years, from 1884 to 1889 inclusive, the New York Legislature passed 1,284 Acts relating to the 30 cities of the State,[1] 390 of the Acts affecting the city of New York. In 1886, 280 out of 681 statutes were local municipal laws. The Committee says: —

"Our cities have no real local autonomy; local self-government is a misnomer, and consequently so little interest is felt in matters of local business that in almost every city in the State it has fallen into the hands of professional politicians."[2]

Home rule for municipalities has received considerable support in the last few years;[3] and it

[1] Senate Com. Rep., vol. v., p. 459. [2] *Ibid*, p. 13.

[3] See Oberholtzer, "Home Rule for Amer. Cities," Annals Am. Acad. Pol. Sci., 3–7361, 893; Seth Low, "Municipal Home Rule," address at Brooklyn, Oct. 6, 1882; J. S. Fassett, "Unmixed Self-Rule for Cities;" Our Day, 7–411, 1891; Prof. F. J. Goodnow,

certainly would very greatly simplify municipal government and accelerate municipal progress if the French and German rule, according full municipal liberty to do any act not contrary to the provisions of State and national law, and Judge Cooley's rule of limitation on legislative power, with a guaranty of local election or appointment of municipal officers, and the ordinary restrictions as to special legislation, could all be incorporated in the Constitution of every State in the Union. The Constitution of every State should define the scope of State control as clearly as the Federal Constitution defines the scope of national control; all laws should be required to be general, and confined to State interests; and no statute should be valid that attempts to exert a larger control over the private property or business of a municipality than may be lawfully exerted over similar property and business in the hands of private corporations. The rule should be, not that a city or town can do only what it has received permission to do, but that within its sphere of local public action it may do anything it is not forbidden to do. Then a

"Municipal Home Rule," McMillan & Co., 1895: Address of Dr. James of Chicago University in Proceedings of National Municipal League, vol. i.; Parsons on "Municipal Liberty," in *Boston Law Magazine*, May, 1897, and in the Proceedings of the League of American Municipalities at the Detroit Convention, 1898; and a much fuller treatment by Professor Parsons in "The Rights of Cities," Equity Series, No. 2, to be published in December, 1898, by C. F. Taylor of Philadelphia.

city or town or village would not have to educate the whole State up to a new idea in order to take a progressive step in the management of its local affairs; the chaos of local laws would cease, and the eternal running to the Legislature for permission to enlarge the Jonesville water-works, get a new engine for the fire-department in Plymouth, or have a street railway in Pelham, would be no more; civic independence would develop civic interest, pride, and patriotism; elasticity, simplicity, and spontaneity would take the place of indifference and cumbrous complexity; local self-government would be substituted for State paternalism; and the schemes of unscrupulous men for capturing offices, contracts, and franchises through legislative influence would be confined to much narrower limits than now. There are few legal measures before our citizens to-day of so much importance as the establishment of municipal home rule.

II. COMPETITION.

The Right of the Public to Compete with Private Enterprises.

If the Legislature grants a private individual or corporation an exclusive right, and does not reserve a power of revocation, it cannot authorize an undertaking in competition with the business

protected by said exclusive grant, except upon full compensation.

The grant is a contract, and is protected by the Federal Constitution. Such exclusive grants are strictly construed. An exclusive gas franchise does not prevent the granting of an electric-light franchise in the same field.[1]

An exclusive grant of the right to supply a city with water from Three Mile Creek is not impaired by a second grant to another to supply the city with water from any other source than Three Mile Creek.[2]

If the context shows that the Legislature intended to grant an exclusive privilege only as against other *private corporations*, a municipality is not excluded; or if the Legislature (in 1867) grants a town the right to build water-works on a vote of the people to that effect, and afterward (1874) makes the rights of existing water companies exclusive in their districts, the prior grant to the town is not shut out, although the said vote was not taken till after the company accepted the provisions of the law of 1874.[3]

An exclusive grant does not shut out the right of eminent domain. No matter how exclusive the franchise, it may be taken by the State, or a mu-

[1] Newport L. Co. *vs.* Newport, 151 U. S., 527 (1893).
[2] Stein *vs.* Bienville Water Supply Co., 141 U. S., 67,80 (1870).
[3] Lehigh Water Co.'s Appeal, 102 Pa. St., 515, 527.

nicipality under State authority, upon payment of full value for the privilege taken. This right of eminent domain cannot be forfeited by legislative action; a legislative agreement not to exercise the power of eminent domain is void, as no legislature has authority to give away the fundamental powers of government.[1]

A grant will not be construed to be exclusive unless it is made so in express terms, or by necessary implication.[2]

If no exclusive grant is affected, the State may act, or authorize a city or town to act, in competition with private enterprise without compensation for the injury done to private business. Wherever an individual or a company can compete, the public may do the same. The rights of a million men who form a city are not less than those of a dozen men who form a corporation, and it makes no difference whether the business is one that requires a franchise or not.

"Where the grant is not by its terms exclusive, the Legislature is not precluded from granting a similar franchise or erecting a rival way or structure, the result of which may be to greatly impair or even totally destroy the value of the former grant; and such damage is not a *taking* of the

[1] Cooley on Const. Lims., 339. See also Crosby *vs.* Hanover, 36 N. H., 404; a franchise however exclusive may be taken in whole or in part upon fair compensation.

[2] Lewis on Eminent Domain, § 136. Turnpike Co. *vs.* The State (Md.), 3 Wall., 210.

former franchise which entitles its owner to compensation." [1]

If no exclusive privileges are conferred expressly or by necessary implication, the Legislature is free to authorize the construction of a rival road, although it may affect the earlier franchise very injuriously. The State impairs no contract by chartering a second company, although it largely manages it and profits by it to the injury of the first.[2]

The leading case is Charles River Bridge *vs.* Warren Bridge.[3] A toll-bridge was established

[1] Lewis, § 136.

[2] Turnpike Co. *vs.* The State (Md.), 3 Wall., 210, 213 (1865). The court says, "It might have been very proper for the State, when chartering the railroad, to have provided for compensation for the prospective loss to the Turnpike Co., as has frequently been done in other States under similar circumstances; but this was a question resting entirely with the Legislature of the State, and their action is conclusive on the subject."

[3] 7 Pick. (Mass.), 344, 464 (1829), 11 Pet. (U. S.) 420; Taney, C. J., 536, 546, 549. The first company took their grant subject to the general authority of the Legislature to make further grants.

Dissent by Putnam, J. (7 Pick., 477, *et seq.*, citing Eng. cases to show that a ferry cannot be established so near to an old one as to draw away its custom), and by Parker, C. J., at 514, holding that the establishment of a new bridge near an old one was not a taking of property for public use, but that the nature of our government prohibited the Legislature from making a grant to the necessary injury of a prior grant without provision for just compensation. The Chief Justice said: —

"This restriction upon the sovereign power (requiring compensation for property taken for public use) does not, I apprehend, depend on any limitation of its authority by written constitution, but results from immutable principles of justice, which require an equal contribution to public exigencies, and would prohibit the

under legislative grant. Afterward another bridge privilege was granted near the first and under conditions which made it free in a few years, thereby completely destroying the value of the first franchise. It was held that the Charles River Bridge Co. had no remedy. Their grant was not exclusive in terms, and could not be extended by implication for several reasons.

"(1) It was made by agents appointed for short periods and with limited powers; (2) The grant itself was a restriction on the power of subsequent legislatures; (3) The extension of the grant is in derogation of the rights and against the interests of the people; (4) It tends to promote monopolies and exclusive privileges which ever ought to be guarded against and restrained; (5) Such constructions of existing grants would prove an insuperable obstacle to future improvements."

In the same decision, pp. 457–458, the court says: —

"In many cases the Legislature have established new turnpikes, some nearly parallel with and diverting travel to the injury, and sometimes ruin, of former ones. There never has been brought before any judicial tribunal a question as to the constitutionality of these charters. But many adjudications have been based on their validity. There is

sacrifice of the property of one, even for the advantage of the whole. Such principles are recognized in all civilized governments, and if not expressly declared, are practically acted upon. 2 Kent. Com., 270."

no contract by the commonwealth that no new charter shall be granted, which shall interfere with the business or profits of the old." (See also p. 473.)

In another case a free bridge was erected within 49 feet of a toll bridge, totally destroying the value of the former franchise, and it was held that there was no remedy, although the right to grant a second franchise was not expressly reserved in the former grant, it being implied unless expressly prohibited by the first grant.[1]

In Ohio the law permits any city or town to erect or purchase gas-works whenever the council deems it expedient.[2] And a city may procure its own gas-works, and supply the city and its citizens, although a gas company incorporated before this law was enacted is in operation in the city, and is not in any default. The construction of gas-works by the city under such a law does not impair the obligation of contract. The gas companies took their charters subject to such contingencies, which might arise at any time by the exercise of legislative power to authorize municipal works.[3]

In Iowa a city or town may purchase, establish,

[1] Fort Plain Bridge Co. *vs.* Smith, 30 N.Y., 44, 62 (1864); citing 11 Pet., 420; 1 Barb., Ch. 547.

[2] Ohio Statutes, Revis. of 1897, §§ 2486-7; State *vs.* City of Hamilton, 47 Ohio St., 52; Hamilton Gas Light Co. *vs.* Hamilton City, 146 U. S., 258, 265-6 (1892).

[3] Hamilton Gas Light Co. *vs.* Hamilton City, 146 U.S., 258, 268 (1892).

erect, maintain, and operate, within or without the corporate limits, water-works, gas-works, electric-light and power plants, and may grant to individuals or corporations authority to erect and maintain such works. The term is not to exceed twenty-five years. No exclusive franchise is to be granted; and no such plants can be authorized, established, erected, purchased, leased, or sold, or franchise extended or renewed, unless the proposition is favored by a majority of the electors voting on it at a general or special election. Under these provisions, it is held that a municipality may supply its inhabitants with light or water by a plant of its own, although a franchise for the same purpose may previously have been granted by the municipality to a private company.[1]

The "Indiana Statutes" (1896) provide that—

"in cities of 35,000 or more population, the city board of public works (appointed by the mayor) shall have power to purchase or erect, by contract or otherwise, and operate gas-works, electric-light works, street-cars and other lines for the conveyance of passengers and freight, telegraph and telephone lines, steam and power houses and lines, to supply the city and its inhabitants," or to purchase and hold a majority of the stock of corporations organized for either

[1] Thomson-Houston Electric Co. *vs.* Newton, 42 Fed. Rep., 723; bill to enjoin the city from erecting an electric plant, the company having spent $20,000 in building a plant under its franchise previously granted it by the city, and being able to furnish all the electricity needed. See Iowa Code, 1897.

of the above purposes. Also "to authorize and empower by contract, telegraph, telephone, electric-light, gas, steam or street car or railroad companies to use any street, and prescribe terms and conditions of such use, except that franchises are not to be for a longer term than twenty-five years, nor for a less return than 2 per cent of the gross receipts. The exercise of all these powers is subject to the approval of the city council, which has 'exclusive control of the streets.'"

In Kansas, under the laws of 1897, any municipality may build or buy gas, electric-light or power, water or heating plants, and sell to its inhabitants.

In California sixth-class cities (all municipalities under 3,000 inhabitants) may acquire, own, construct, maintain, and operate street railways, telegraph and telephone systems, gas and other works for heat and light; and fifth-class cities (municipalities between 3,000 and 10,000 population) may purchase, lease, or construct water or electric-light works, and sell water, heat, light, and power.

In Missouri any municipality may build or buy water, gas, electric-light or power plants, and sell water, gas, etc., to inhabitants.

In South Carolina the Constitution of 1895 provides that any city or town, on a vote of a majority of its electors, may build or buy water-works or light-plants, and supply its inhabitants.

Utah's statutes in a single clause give city coun-

cils power to construct and maintain water-works, gas-works, electric-light works, street railways, or bath-houses, or to authorize the construction and maintenance of the same by others, or to purchase any or all of said works from any person or corporation.

The Washington statutes of 1897, chap. 112, provide that any incorporated city or town may construct or buy, own and operate, water-works (within and without its limits), gas, electric-light, or other light plants (to serve the city or town and its inhabitants with public or private supplies of water, light, heat, and power), and cable, electric, or other railroads within its limits for the transportation of freight or passengers. A referendum is necessary; and if debt is to be incurred, the proposition must be adopted by a three-fifths vote at the polls.

In Wisconsin any city or village may buy water-works or light-plants; municipalities may build lighting-plants for street service, and may buy commercial plants, or, if there are none, or none willing to sell, the city may erect such plants.

The Minnesota Statutes (1894), §2592, provide that no corporation shall establish gas, electric light, heat, transportation, or other improvement except on obtaining a franchise from the city or village and making just compensation; and at the end of each and every franchise period of five years

the council may, on a two-thirds vote of the electors of the city or village, buy at eminent domain value, and own and operate, the gas, electric-light, street-railway, water, telephone, heat, or power works.[1]

In 1891 Massachusetts passed an Act permitting cities and towns to manufacture and distribute gas and electricity, build or buy, maintain and operate, gas or electric-light works, and supply light to the city or town and its inhabitants. An amendment in 1894 permitted municipalities to furnish gas or electricity for heat and power *except* for operating electric cars. A city must have a two-thirds vote in each council, and approval of the mayor in each

[1] Five States have general laws empowering municipalities to own and operate street-railways. In Minnesota any city or village has this right on a two-thirds referendum vote. In California the right belongs to sixth-class cities; to cities of more than 35,000 population in Indiana; to every city council in Utah; and to every incorporated city or town in Washington.

Ten States have general laws authorizing municipal telegraphs or telephones or both, and in five of the States the power is commercial. In Kentucky third-class cities (8,000 to 20,000) may supply their inhabitants with telephone service. In Washington third-class cities (1,500 to 10,000) and towns (all municipalities of less than 1,500 people) have authority to construct and maintain telegraph and telephone lines. In California municipalities of less than 15,000 population have unrestricted power to build and operate telegraph and telephone systems; but for larger places there is no general provision for anything more than a fire-alarm or a police telegraph. The laws of Minnesota and Indiana have already been stated in the text.

In Parsons on "Government by the People," Equity Series, No. 2 (published by C. F. Taylor, Philadelphia), will be found a much more complete treatment of the rights of municipalities than is possible here.

of two consecutive years, and ratification by the majority of the electors at an annual municipal election. A town must have a two-thirds vote in each of two legal town meetings, 2 to 13 months apart. The municipality must buy suitable existing works if the owners file a schedule of property and terms of sale with the clerk of the city or town within 30 days after the final vote to establish municipal works.[1]

The supreme court remarked in the Wakefield case, that "the Legislature might have authorized cities and towns to erect and maintain such plants without requiring the purchase of any existing plants." [2]

It is a question how far it is fair for the public to enter into competition with private parties. It may be said that one man or ten men have a right

[1] The Florida Acts of 1897 contain a statute modeled on the Massachusetts law. It does not, however, require double adoption, — a two-thirds vote of council, approval of mayor, and ratification by the voters at the polls, being sufficient, without repeating the operation the following year. If the proposition fails at the polls, no similar proposal can be submitted for ratification within one year.

The extreme restrictions in Massachusetts are due to the strenuous efforts of the lighting-companies. It took a three years' struggle to get the law; and even then it was not possible to pass it, except with amendments which seriously diminish its value. (See *infra*.) The law is, however, much better than none. Before it was passed, cities and towns in Massachusetts had no power to establish electric plants, even to light their own streets. Spaulding *vs.* Peabody, 153 Mass., 129 (1890).

[2] Citizens Gas Light Co. *vs.* Wakefield, 161 Mass., 432, 439.

to compete with existing industries, and surely the right of 100,000 men, constituting a city, cannot be less than the right of ten men. On the other hand, it is to be noted that a public service may be operated at cost, or even below it, the deficit being made up by taxation, so that a private business is at the mercy of a public rival. A small private business is at the mercy of a large private business, especially if the latter enjoys a railway rebate, or possesses, through a trust or combination, a virtual monopoly of the field. Public sentiment and law condemn such operations as lacking in fair play, and public competition at rates too low to afford a living to private enterprises may be at times equally unfair. The *law* is perfectly clear that where no exclusive franchise is affected, the public may compete with private business. But *ethics* can hardly yield assent to such a doctrine. It means the right to destroy private property. The law that forbids a State to take a bridge and its franchise except upon full compensation, and yet permits the State to build a free bridge by the side of the first and rob it of all its value, is not a consistent law. The government stands for justice — it should not be unjust; for protection — it should not destroy; for peace — it should not make war. It is the part of the public to set an example of coöperation, not of competition.

When the public good requires a State or mu-

nicipality to engage in business in opposition to private interests that have grown up under the sanction of law, it is only fair that compensation should be made so far as possible. The change to public action is for the benefit of the community, and the cost and burden of it, so far as possible, should be borne by the community, and not allowed to fall with crushing weight on any individual. Note the words, "so far as possible." In many cases it may be impossible to estimate damages; but where the effect is swiftest, and the need of adjustment most intense, an estimate can usually be made. If a city should open a grocery store on a small scale, enlarging it little by little, the effect, as a rule, would be diffused and gradual, very difficult to estimate, and at the same time not of so much importance that it be estimated, because its diffusion and gradualness would prevent any sudden and crushing disaster to those already in the business. But if a city or county or State parallels a toll-road with a highway free of toll, or builds a bridge by the side of a private ferry, a sudden and crushing loss occurs that is not difficult to estimate, and ought to be estimated and borne by the public. In every case the methods of transition should be such as to secure a just diffusion of the burdens of the change so far as practicable.

III. PURCHASE.

The Right of the Public to Take Private Property, and the Price that Must be Paid.

The State may take, or authorize a city or town to take, any private property that is desired for public use. Even rights protected by a grant that is by its terms exclusive and irrepealable may be taken under this power of eminent domain, or pre-eminent domain as it might be called. The sole conditions are that the taking shall be for a public purpose, and that full compensation shall be made.[1] The Fifth Amendment to the National Constitution provides that private property shall not be taken without just compensation. What constitutes just compensation is a judicial not a legislative question.[2] It may be determined by any impartial

[1] A statute authorizing a board of transportation to require a railroad, that has granted elevator sites on its right of way near a station, to grant on like terms another elevator location on that right of way to other private parties, is invalid. The taking of the private property of one person or corporation, without the owner's consent, for the private use of another, is not due process of law, and is a violation of the Fourteenth Amendment of the Federal Constitution. (Missouri Pre. Ry. Co. *vs.* Nebraska, 164 U.S., 403.)

[2] Monongahela Nav. Co. *vs.* United States, 148 U.S., 312, 327, 342. The court said, "The Legislature may determine what private property is needed for public purposes, — that is a question of a political and legislative character; but when the taking has been ordered, then the question of compensation is judicial. It does not rest with the public taking the property, through Congress or the Legislature, to say what compensation shall be paid, and the ascertainment of that is a judicial inquiry."

tribunal the Legislature may choose to designate;[1] but the Legislature cannot itself determine the amount to be paid,[2] nor can it give the municipality a right to fix the damages.[3] One of the parties to a transaction cannot be regarded as an impartial tribunal in respect to it. The assessment of damages may, however, be made by a committee of the city council, if it is provided that the owner may have a review in the courts on application.[4]

As a general rule, the measure of damages is the fair market value of the property. In the case of land, the annual profits will not be considered,[5] but

[1] People *vs.* Smith, 21 N. Y., 595. In the absence of constitutional provision to the contrary, the tribunal may be a jury or a commission, or a court without a jury, Oakes Ames *vs.* Rd., 21 Minn., 241; but decision by a board appointed by the Legislature, and acting without notice to or hearing of the owners of the property, will not suffice (16 Minn., 375); a hearing or opportunity for one is essential to a judicial procedure. In Pennsylvania the constitution secures an appeal and trial by jury when private property is taken by a municipal corporation. Bachler's Appeal, 90 Pa. St., 207.

[2] 11 Pet., 420. See also 60 Md., 263; — the Legislature cannot fix the compensation in the law itself.

[3] 53 Ill., 105.

[4] McMicken *vs.* Cincinnati, 4 Ohio St., 394.

[5] Lewis on Eminent Domain, § 487. "It is incompetent to go into the profits of the business carried on upon the property. No damages can be allowed for injury to business. (106 Ill., 253; 111 Ill., 499; 109 Mass., 438; 107 Pa. St., 461; 49 Cal., 139.)

"Any incidental loss or inconvenience in business, which may result from a change consequent upon the taking, must be borne by the owner, for the sake of the general good in which he participates." (118 Ill., 587.)

the owner may show what he gave for the property and what improvements he has made, and witnesses versed in land values of the neighborhood may be asked the value of the realty, not at forced sale, but at ordinary, voluntary sale; and that is the measure of compensation under the law of eminent domain.[1]

When a city opens a new street that crosses a railroad, the measure of damages is the decrease of value of the railway's land for use for railway purposes caused by its use for street purposes. The railway cannot recover the value of the fee in the land, for the city merely takes an easement; nor can it recover the cost of erecting gates, planking the crossing, and maintaining flagmen at the new street. All property is owned subject to the power of the State to regulate its use in such manner as not to endanger unnecessarily the lives and personal safety of the people. The requirement that compensation be made for private property taken for public use imposes no restriction on the inherent power of the State to protect the lives and secure the safety of the people.[2]

In estimating the compensation, special and direct benefits from the highway or public under-

[1] Moulton *vs.* Newburyport Water Co., 137 Mass., 163; 100 Mass., 350; 125 Mass., 1 and 544; 112 Ill., 589; 31 Minn., 297.

[2] Chicago, Burlington & Quincy R. R. *vs.* Chicago, 166 U. S., 226 (1896).

taking capable of present estimate and reasonable computation may be deducted.[1]

When a franchise is taken, the net earnings are generally considered,[2] and also the market value of the capital stock, if there is any. In Monongahela Nav. Co. *vs.* United States,[3] the court decided that in construing the Act of Congress, Aug. 11, 1888, ordering a lock and dam to be taken for public use, the clause providing that —

"in estimating the sum to be paid by the United States, the franchise of said corporation to collect tolls shall not be considered,"

was not valid nor binding on the court. The court continued —

"How shall just compensation for this lock and dam be determined? The value of property, generally speaking, is determined by its productiveness, — the profits which its use

[1] Bauman *vs.* Ross, 167 U. S., 548 (1897).

[2] When a bridge and franchise are taken, the tolls may be used to measure the damages. (Montgomery County *vs.* Schuylkill Bridge Co., 110 Pa. St., 54.) So the amount of tolls is competent evidence where a ferry right is injured by the erection of a bridge. (Columbia Delaware Bridge Company *vs.* Geisse, 38 N. J. L., 39; Mason *vs.* Harper's Ferry Bridge Co., 17 W. Va., 396; 20 Id., 223.) Exclusive right of transportation within one-half a mile of the ferry having been given, and a bridge erected within this limit, *Held* that the damages to the ferry were measured by its revenues, although the Legislature might in future take away the franchise or reduce the tolls.

[3] 148 U. S., 312, 327; citing Charles River Bridge *vs.* Warren Bridge, 11 Pet., 420, 571; Commonwealth *vs.* Pittsburg &c. Rd., 58 Pa. St., 26, 50; Pa. Rd. *vs.* B. & O. Rd., 60 Md., 263; Isom *vs.* Mississippi Central Rd., 36 Miss., 300, 315.

brings to the owner. The value is not determined by the mere cost of construction, but more by what the completed structure brings in the way of earnings to its owner." [1]

"It makes no difference to the United States that the State of Pennsylvania reserved the right to take the property on payment of the original cost with interest — the State has not exercised its reserved power nor transferred its rights to the United States." [2]

Where a bridge was taken for public use in Pennsylvania, the court said, —

"Value is to be ascertained not only by the cost of the structure, but also by the value of the franchises. The value of the company's franchises depends largely on its earning capacity. The value of its capital stock may, and generally does, indicate with some accuracy the value of its franchises. Hence the cost or value of the structure, the amount of net tolls, and the market value of its capital stock, are all elements to be considered in ascertaining the value of the bridge and its corporate franchises. No one of these elements, standing alone, would in all cases furnish a test; considered together they will seldom fail to lead to a satisfactory result." [3]

In another case the court says, —

"The property and franchises of the bridge company are represented by its stock."

The income for the past five years is proper evidence of the value of the franchise; its value

[1] 148 U. S., at 328, Mar. 27 (1893). [2] 148 U. S., at 343–4.

[3] C. J. Paxson in Mifflin Bridge Co. *vs.* Juniata County, 144 Pa. St., 365, 374-5 (1891).

depends on its productiveness. The mere cost of the bridge is not the true measure, that would take the franchise for nothing.[1]

Where the Legislature authorized the construction of a bridge and payment of damages to a ferry company, the measure of damages was held to be the earnings lost; and evidence of the earnings received in the past six years was held competent.[2]

It appears, however, that compensation is not always determined by market value or productiveness. In a Pennsylvania turnpike case the Supreme Court said that the public could not take the property of a corporation for nothing, merely because its stock may have no market value, or the property may be unproductive. It was worth to the city what it would have cost to grade and fix the road as it was when taken.[3] If this rule is sound, it would seem that the measure of compensation is compounded by two elements, — the State or city must pay at least the cost of duplicating such improvements as will be of use to the public, and if the property has a market value that rises above the said cost, the public must pay this market value. It may be said that it is not fair to require a city to pay for property that has no market value;

[1] Montgomery County *vs.* Bridge Co., 110 Pa., 54 (1885).

[2] Columbia Delaware Bridge Company *vs.* Geisse, 38 N. J. L., 39.

[3] *In re* Kensington &c. Turnpike Co., 97 Pa. St., 260, 277. Dissent by Sharswood C. J., Trunkey and Sterrett, J. J.

and on the other hand, it may be said that the values of stocks and franchises fluctuate. A company that could not sell for $10,000 may be worth $100,000 two or three years from now; and it is not just to take advantage of a depreciation that is perhaps temporary, in order to obtain for nothing a property on which large sums have been expended for improvements that are of value to the taker.

A Legislature may squeeze the water out of stock, and reduce the market value of a franchise within reasonable limits, by exercising its power of regulating rates.[1] The police power, however, cannot be colorably used in this way to *destroy* vested rights without compensation.[2] Abolishing tolls, or making a toll bridge free, is a "taking" within the Constitution, and demands compensation.[3]

Where a franchise is not exclusive, the water may often be eliminated by competition;[4] but the process frequently requires wasteful duplications, and is, to say the least, a kind of warfare.

Where the Legislature has reserved the right to repeal a franchise granted by it, it may terminate

[1] See below, fifth subhead, *Regulation.*

[2] Commonwealth *vs.* Essex Co., 13 Gray, 239; 55 Pa., 466; 133 Ill., 413.

[3] Monongahela Nav. Co. *vs.* United States, 148 U.S., 312; 91 Pa., 216; 4 Gray, 474; 6 How., 507.

[4] See above, second subhead, *Competition.*

the franchise at will, and leave nothing to be paid for on taking the property except the physical plant, which in many cases will be valued at the cost of duplication.[1]

By the Massachusetts lighting law, providing for municipal purchase of gas and electric plants, the price of the property

"shall be its fair market value for the purposes of its use (no portion of such plant to be estimated, however, at less than its fair market value for any other purpose), including as an element of value the earning capacity of such plant based upon the actual earnings being derived from such use at the time of the final vote. Such value shall be estimated without enhancement on account of future earning capacity or good will, or of exclusive privileges derived from rights in the public streets."

This compels the municipality to pay the full present value of the franchise as well as the cost

[1] Greenwood *vs.* Freight Co., 105 U. S., 13, 17, 23. Massachusetts has reserved the right to revoke any charter of incorporation subsequent to March 11, 1831. The Legislature repealed the charter of a street-car company, and permitted the new company to take the old tracks subject to the laws relating to the taking of land and the compensation to be made therefor. This was held valid by the Supreme Court of the United States. The old company could not demand pay for its franchise, as it had none, the Legislature having revoked it.

There is nothing in the Constitution of Massachusetts like the New York provision putting the grant of street railway franchises into the hands of the city beyond the reach of the Legislature. (See the Broadway Surface Railway case *infra*.) The local consent to track locations in Massachusetts is a right derived from the Legislature, and revocable by it.

of duplicating the works. Wakefield paid $135,000, which was said to be $50,000 more than the works were worth on the basis of the cost of duplication.

In several cases municipalities have voted heavily for municipal lighting, but have not carried out their purpose when they discovered how much it would cost to pass the threshold under this statute. An unsuccessful effort has been made to amend the law so that a municipality would only be required to pay the "reasonable cost of buying and establishing a plant of equivalent capacity, counting at its fair market value the land purchased."[1]

[1] Such an amendment passed the House once, and came within two votes of passing the Senate. The Hon. Henry Winn, a high authority in this matter, says that a city ought not to be required to pay for its own patronage. The "fair market value for the purposes of its use" on the basis of "actual earnings" means the value of the privilege of making light at 50 or 100 per cent profit, if the company is making that. "To compel the people to patronize a monopolist, and to confer also on the monopolist the right, when the people seek to supply themselves, to extort from them pay for the very patronage they are forced to give him, as if he had a vested right in it, when he got his monopoly for nothing, is gross tyranny. . . . If the people of a city can revoke a franchise, or let in a competitor without paying the private company, why should they be mulcted when they do not revoke the franchise, but only compete? . . . One of the monopolist's risks was that the Legislature would authorize public plants."

"What ought the people to pay? Not for the business they have been forced to give, or the monopoly got from them for nothing, but for what they get in tangible property and private rights not derived free from the public — at a liberal price. We are willing to give the companies for their old machinery the cost of new that will do equal work, for their old and rusted pipes the cost of

When a town in Massachusetts intends to establish public water-works, if an existing local water company desires to sell to the town, and the town and company cannot agree on the price, it is customary for the Legislature to provide that three commissioners shall be chosen who shall fix the

laying new ones. Thus the wear and tear and decay and depreciation is made up to them in excess of what the property is really worth."

"This price is enough; for it is simply a matter of grace, and not of right, that the public are forced to buy."

"It is enough, even if the monopolist has a vested right to be paid for his business. *For the State is morally bound to so regulate his charges that he shall not make more than the average profit of his neighbor under competition.*"

"When the owner of a cotton-mill can get for his mill, and for his old and worn machinery, the cost of new, he has got more than the real capital he had in these items. He would be glad to get it without asking pay for the dam that washed away ten years before. He can take it, and get with it the ordinary returns of capital in any other investment he chooses. So can the manufacturer of light."

This argument is very strong, and yet the case is by no means clear. To pay for the franchise on the basis of present earnings is to pay for a value largely due in many cases to unjust charges. Such a rule puts a premium on fraud and extortion. To pay the market value of franchises is to pay the market value of watered and fictitious stocks. This is manifestly unfair. On the other hand, multitudes of people have bought these stocks under the sanction of existing law. To pay only the cost of duplicating the plant will "confiscate" the value of these investments. Suppose the franchise was a gift, may one take back a gift at will, even though it may have been sold to third parties for value? Suppose the rates are too high; whose fault is it? Many a stockholder might be willing to reduce rates as the business grows, but cannot make his views prevail. The public could reduce the rates, but has not done so. As between such stockholders, whose "agents" (beyond their control perhaps) have not done their duty

value without allowance for franchise. The following are examples: —

Newburyport: Acts of 1894, chap. 474, sec. 1, closing sentence: —

"Such value shall be estimated without enhancement on account of future earning capacity or good-will, or on account of franchise of said company."

as to lowering rates, and the public, whose "agents" (also beyond any easy and efficient control) have neglected their duty as to lowering rates — as between these two, which one should bear the loss? The change is for the benefit of the whole people. The public is better able to bear the loss than many of the stockholders who invested their money under public sanction; it seems, therefore, no more than fair that the city should pay the market value of the property, franchise and all. Where no power of revoking the franchise has been reserved, payment of the market value of the franchise is required by existing constitutional guaranties. In such cases there is no way but to exercise the power to compete, or the power to reduce rates, or else pay for the water. There may seem to be little difference in ethics between the method of squeezing out the water by reduction of rates, and then taking the property at fair value, and the method of taking the property at once at the same fair value. In fact, however, there is a great difference, ethically as well as practically, between a proceeding which accords with the habits of thought and the settled laws of the country, and a proceeding which violates those habits and laws.

This question of compensation for franchises is one of the most difficult in the whole range of municipal law. Happy is the city or town that can solve the problem by *keeping* its franchises from the start, or by putting conditions in franchise grants securing fair rates and good service, and providing that after 10 or 20 or 30 years the whole property, franchise, and physical plant in good condition, shall become public without further compensation. This method is frequently used abroad, and a similar plan has been adopted by Springfield, Ill., to obtain a municipal lighting-plant.

Gloucester: Acts of 1895, chap. 451, sec. 16, closing sentence: —

"Such value shall be estimated without enhancement on account of future earning capacity or future good-will, or *on account of the franchise* of said company."

Stoneham: Acts of 1897, chap. 473, sec. 13, near the end: —

"Who shall determine the fair value of said property *without allowance for past, present, or future earnings or earning capacity, good-will, or any franchise or privilege of said company.*"

Where a railway company is operating under franchises entirely subject to legislative control, and its charter is repealed for abuse according to a power reserved therein, it has been held that the road becomes the property of the State without compensation being paid for it.[1]

But where a railway company, though organized

[1] Erie & North East Rd. Co. *vs.* Casey, 26 Pa. St., 287, 300, 302, 307–8, 324–5. The charter provided that "If the said company abuse or misuse any of the privileges hereby granted, the Legislature may resume the rights granted to said company." The charter was repealed for abuse; and the defendant was appointed by the governor (under legislative authority) to take possession "of the road the company had built, and keep it in good running order for the use of the public." The company said this was confiscation, taking private property for public use without compensation, in violation of the Federal Constitution. But the court said, No. "*This act takes nothing but the road. Is that private property? Certainly not!* It is a public highway, solemnly devoted by law to public use. When the lands were taken to build it on, they were taken for public use; otherwise they could not have been taken at all. It is true that the plaintiffs

under legislative authority, constructs and operates its tracks in the streets of a city by virtue of a franchise derived from the city government, acting, not under legislative permission, but by exclusive authority conferred by the Constitution, a

(Ry. Co.) had a right to tolls from all who traveled or carried freight upon it, but that was a mere franchise, — a privilege derived entirely from the charter, and it was gone when the charter was repealed. . . . When the franchise ceases, the highway is thrown back on the hands of the State. . . . She may renew the franchise, give it to some other person, exercise it herself, or declare the highway open and free to all people. If the railway itself was the private property of the stockholders, then it remains theirs, and they may use it without a charter as other people use their own — run it on their own account — charge what tolls they please — close it or open it when they think proper — and disregard every interest but their own. The repeal of charters on such terms would be courted by every railroad company in the State; for it would have no effect but to emancipate them from the control of the law, and convert the limited into a broad, unbounded license. On this principle a corporation would be rewarded, but never punished for misconduct. . . . Railroads made by the authority of the Commonwealth upon lands taken under her right of eminent domain, and established by her laws as thoroughfares, are her highways. No corporation has any property in them, though corporations may have franchises annexed to and exercisable within them. . . . Railroads are public highways. On this principle alone we decided that municipal subscriptions were valid. On this principle alone can lands and materials be seized to make them. . . . On this principle alone we have always held that no individual or corporation can possibly have any right or privilege connected with them except what the law has expressly conferred. . . . By the charter, and by the charter alone, were the plaintiffs authorized to interfere with the road at all; the repeal necessarily took that authority away. A public highway is not private property any more than a public office. . . . The removed officer has no right to keep the records etc., and the removed company has no right to keep the road." This Erie case is one of the most remarkable in the reports.

revocation of charter by the Legislature does not destroy the property rights in the city streets arising under the city grant.[1]

IV. PREVENTION.

The Right to Prohibit Discrimination, Monopoly, and Other Abuses.

Municipal charters usually contain express authority to suppress nuisances, and prohibit injurious

[1] People *vs.* O'Brien, 111 N. Y., 1, the Broadway Surface Railway Case. The Broadway Co. was organized under legislative Act; but its street rights could only be obtained from the city, because the Constitution of New York requires consent of the municipal authorities to the construction and operation of street railways. The company secured its street franchise by the expenditure of half a million in bribing aldermen, paying lobby expenses, etc. Upon proof of this corruption, the Legislature revoked the company's charter, and the Attorney General claimed that all street rights were forfeited. But the court said, No. The *city*, not the State, had granted the street franchise. The city had not reserved any right of revocation, and the corrupt means by which the street privileges had been obtained were not in evidence before the court; "they are not involved in this case, and have no bearing on the questions presented for discussion by the record. They were neither alleged in the complaint, supported by proof, or presented in the arguments of counsel." The mortgages and bonds of the company had been sold to persons ignorant of any taint in them. The railway corporation ceases to exist on withdrawal of its charter; but its street rights being beyond legislative creation or control remain in the hands of its officers as trustees for the mortgagees, bondholders, creditors, and users of the road, and statutes expressly providing for taking away such street rights on dissolution of the company are unconstitutional and void. The Legislature cannot take away property rights granted by the city in perpetuity under constitutional authority independent of and above the Legislature.

conduct of various sorts. Sometimes the law goes into considerable detail. For example, a recent statute in Montana provides that a municipal council may regulate or prohibit the wearing of hats and bonnets in theaters, churches, and other places of amusement. It is not unusual to require consent of the local authorities before a street-railway company can build its tracks in the streets.[1] Sometimes the same rule is extended to gas and water pipes, electric light, telegraph, and telephone wires, etc.[2] These constitutional and statutory rights to appoint and revoke locations and control street franchises, or to grant them on such terms as the municipality may deem proper, are of great importance, as a partial recognition of the right of local self-government, and an aid in checking corruption and undue preponderance of corporate power.

The most imposing efforts of industrial law in the way of prevention relate to discrimination and monopoly. The courts have built up a rule against discrimination by common carriers, innkeepers, etc., and statutes enacted by States and nation have

[1] This is required by the Constitution in New York, West Virginia, Illinois, Missouri, Nebraska, South Dakota, South Carolina, Georgia, Alabama, Kentucky, Idaho, Colorado, and Wyoming. Even in States like Massachusetts, where the Constitution is silent on the subject, it is customary for the Legislature to give municipalities a veto power in respect to street locations and franchises.

[2] See the Constitutions of South Carolina, South Dakota, Kentucky, and Wyoming.

emphasized the duty of impartiality on the part of those engaged in public or quasi-public service.[1]

For centuries contracts in restraint of trade or tending to a monopoly, have been null and void in the courts as against public policy. For example, an exclusive grant by a railway of a right of way to a telegraph company is void.[2] So an exclusive contract of right of way over certain land for an oil pipe-line is void.[3] A combination of coal companies or of railways and mining companies to fix prices and prevent competition is void as a conspiracy against the public.[4] An agreement by which gas companies divide up a city, each com-

[1] See Peoria, &c., Ry. Co. *vs.* Coal Valley Mining Co., 68 Ill., 489, declaring void an agreement by which the railway was to pay the C. V. mining company 50 cents a ton on all coal it carried for any other shipper. And Handy *vs.* Cleveland & Marietta R. Co., 31 Fed. Rep. 689, the "Rice case," in which Judge Baxter condemned an agreement by which the railway undertook to carry oil for the Standard Co. at 10 cents a barrel, charge rival shippers 35 cents a barrel, and pay the Standard Oil Co. 25 cents out of each 35 cents collected from rival shippers. Such discrimination "is justly abhorrent to all fair minds. No such dangerous power can be tolerated. . . . Making one shipper pay tribute to his rival, thereby enriching one and impoverishing another, is a gross, illegal, and inexcusable abuse of a public trust, that calls for the severest reprehension."

[2] Western Union Teleg. Co. *vs.* American Union Teleg. Co., 65 Ga., 160.

[3] West Virginia Trans. Co. *vs.* Ohio River Pipe Line Co., 22 W. Va., 600, 626.

[4] Morris Run Coal Co. *vs.* Barclay Coal Co., 68 Pa. St., 173, 186; Stockton *vs.* Central Ry. of N. J., Port Reading Ry. Co. and the Phil. & Reading Rd. Co., 50 N. J. Eq. 52 (1892) *Reading Coal Combine.*

pany agreeing to keep within a specified district, is void.[1] A control of several gas companies in the same city resulting from the purchase by one company of a majority of the stock of each of four other companies is unlawful.[2] A gas combine is void though it causes only a partial restraint of trade.[3] The Lumber Combine,[4] the Nail Trust,[5] the Sugar Trust,[6] the Whisky Trust,[7] the Match Trust,[8] and the Standard Oil Trust,[9] have all been declared unlawful, and their agreements null and

[1] Chicago Gas Light Co. *vs.* People's Gas Light Co., 121 Ill., 530.

[2] People *vs.* Chicago Gas Trust, 130 Ill., 268.

[3] Gibbs *vs.* Consolidated Gas Co. of Baltimore, 130 U. S., 396.

[4] Lumber Co. *vs.* Hayes, 18 Pac. Rep., 391 (Cal.).

[5] Bramkamp Case, U. S. Cir. Court, Indianapolis, Nov., 1896. The Wire Nail Trust succeeded in raising prices from 80 cents to $2.50 a keg wholesale, resulting in a profit of several millions to the trust. Nails were retailing at $3.75 to $4.00 a keg, while farmers were selling corn at 12 cents and oats at 8 to 10 cents a bushel — 40 bushels of oats for a keg of nails that probably cost, in labor and capital, about as much as four bushels of oats. The trust and its allies did not hesitate to break contracts and wreck machines in their efforts to prevent competition. (See *The Iron Age*, Oct. 22, Nov. 19, and Dec. 3, 1896, pp. 795, 988, 1106, 1108.) The destruction of property to break down competition is a familiar thing in the history of the Standard Oil Combine. (See Lloyd's "Wealth Against the Commonwealth," and the public documents cited therein.)

[6] People *vs.* Refining Co., 7 N. Y. Supplement, 406 (Sugar Trust) & U. S. *vs.* E. C. Knight Co., 156 U. S., 1, 11.

[7] State *vs.* Neb. Distilling Co., 29 Neb., 700 (1890), Whisky Trust.

[8] Richardson *vs.* Buhl, 77 Mich., 632 (1889), Match Trust.

[9] State *vs.* Standard Oil Co., 49 Ohio St., 137; 30 N. E. Rep., 279.

void, on the broad ground that whatever tends to monopoly is against public policy.[1]

In the Chicago Gas Trust case the Supreme Court of Illinois said: —

"The Chicago Gas Trust Company has purchased a majority of all the shares of stock of these four companies. It was itself organized with a capital stock of $25,000,000. The capital of the four companies was $16,984,200. The control of the four companies by the appellee — an outside and independent corporation — suppresses competition between them, and destroys their diversity of interest and all motive for competing. Whatever tends to prevent competition between those engaged in a public employment or business impressed with a public character is opposed to public policy, and therefore unlawful. Whatever tends to create a monopoly is unlawful as being contrary to public policy."[2]

In the Baltimore case the court said: —

"The supplying of illuminating gas is a business of a public nature to meet a public necessity. A business of such character presumably cannot be restrained to any extent whatever without prejudice to the public interest, and courts decline to enforce or sustain contracts imposing such restraint, however partial."[3]

[1] In the case of corporations uniting to form a trust or capitalistic monopoly, there is an additional ground of decision in the fact that, in entering the trust and giving over their powers to trustees, the companies or their officers act *ultra vires*. See the Sugar Trust cases in 22 Abbott, N. C., 164; 54 Hun., 354; 121 N. Y., 582.

[2] Citing 2 Add. Cont. 743; 11 Coke, 84 b.

[3] The fundamental legal principles applicable to city monopolies are, for the most part, the same as those which apply to other

In addition to common law decisions we have a great deal of legislation against trusts and monop-

monopolies, and some of the clearest and most forceful statements of these principles occur in decisions not directly concerned with city monopolies. For example, in the Diamond Match case (77 Mich., 632) Chief Justice Sherwood said: "The supply of the article and its price are made to depend on the action of a half-dozen individuals, governed by a single motive or purpose, which is to accumulate money regardless of the wants or necessities of over sixty millions of people. *Monopoly in trade or in any kind of business in this country is odious to our form of government. . . . Its tendency is destructive of free institutions, and repugnant to the instincts of a free people,* and contrary to the whole scope and spirit of the Federal Constitution. Indeed, it is doubtful if free government can long exist in a country where such enormous amounts of money are allowed to be accumulated in the vaults of corporations to be used at discretion in controlling the property and business of the country against the interest of the people for the personal gain of a few individuals. All combinations among persons or corporations for the purpose of raising or controlling the prices of merchandise are monopolies and intolerable, and ought to receive the condemnation of all courts. It is no answer to say that this monopoly has in fact reduced the price of friction matches. That policy may have been necessary to crush competition. The fact remains that it rests in the discretion of this company at any time to raise the price to an exorbitant degree." Pp. 657–8.

In the Standard Oil case (49 Ohio St., 137) the Supreme Court of Ohio said that the object of the trust was to "establish a virtual monopoly" of the oil business, and "to control the production and the price at its pleasure. All such associations are void." As to the claim that the trust had lowered prices, the court said it might be so, "but such is not one of the usual or general results of a monopoly; and it is the policy of the law to regard, not what may, but what usually, happens. Experience shows that it is not wise to trust human cupidity where it has the opportunity to aggrandize itself at the expense of others." The court emphasized the undemocratic tendencies of monopolistic combinations, an objection which it said was "often overlooked, but none the less important." The following words of Justice Marshall, and those

olies,[1] and severe penalties are provided for those who violate the anti-trust laws.[2] Yet these same

of the Michigan judge above cited, ought to be framed in gold, and hung in every court-room and legislative hall in the land: —

"*A society in which a few men are the employers and the great body are merely employees or servants, is not the most desirable in a republic; and it should be as much the policy of the law to multiply the numbers engaged in independent pursuits or (sharing) in the profits of production, as to cheapen the price to the consumer. Such a policy would tend to an equality of fortunes among its citizens, thought to be so desirable in a republic, and lessen the amount of pauperism and crime.*" (49 Ohio St., at 187.)

[1] A State law prohibiting consolidation or pooling on the part of parallel or competing railroad, telegraph, telephone, bridge, or carrier companies, is a valid exercise of the police power. "Whatever is contrary to public policy or inimical to the public interests is subject to the police power of the State, and within legislative control; and in the exertion of such power the Legislature is vested with a large discretion, which, if exercised *bona fide* for the protection of the public, is beyond the reach of judicial inquiry." Louisville &c. Rd. *vs.* Kentucky, 161 U. S., 677, 701 (1895).

[2] The common law principle that private monopolies are inimical to public interest is undoubtedly well based, and its logic applies not only to monopolies of combination, but to all industrial monopolies, "natural," "legal," or "capitalistic." The true remedy for oppressive monopoly of either sort is honest public administration of it for the common benefit. Monopoly means union, economy, and better service on the inside, but probable antagonism to public interest on the outside, and insufficient attention to the rights of labor, so long as the monopoly is in private hands. The way to keep the benefits and get rid of the evils of monopoly is to make it public under good civil service regulations. So far, however, at least in respect to monopolies of combination, the law has aimed at destruction. The success of this policy has been small. Trusts and combinations have been repeatedly declared null and void, and dissolved. But *secret* combines, or solid unions in corporation form, have taken their places, and the monopolies still exist. Moreover, it has been found exceedingly difficult to obtain evidence under either the Interstate

legislative bodies that pass strong laws against monopolies by combination, pass also numerous

Commerce Act of 1887, or the Anti-Trust Law of July 2, 1890, because the courts will not compel a witness to testify to anything that may subject him to a criminal prosecution (see decision that N.Y. Law, 1897, chap. 383, § 7, is unconstitutional on this ground. *Matter of* Attorney General, 21 Misc. Rep., 101; case further considered, but not on this point, 22 App. Div. 285; 155 N. Y., 441).

The Federal Act of 1890 is intended "to protect trade and commerce against unlawful restraints and monopolies." Its provisions apply "to all contracts in restraint of interstate or foreign trade or commerce without exception or limitation, and are not confined to those in which the restraint is unreasonable;" wherefore a contract between railroads in restraint of such trade is prohibited, though it was only for the purpose of effecting traffic rates for the transportation of persons and property. (U. S. *vs.* Trans-Missouri Freight Association, 166 U. S., 290, March 22, 1897.) So "contracts which operate as a restraint upon the soliciting of orders for, and the sale of goods in, one State, to be delivered from another," are prohibited by the said Act. (U. S. *vs.* Addyston Pipe & Steel Co., 85 Fed. Rep., 271, Feb. 8, 1898.) But a combination for the manufacture of sugar, not involving the restraint of sales of goods to be delivered across State lines, does not violate said Act. (U. S. *vs.* E. C. Knight Co., 156 U. S., 1, case against the Sugar Trust.)

The Trans-Missouri case *supra* has just been reaffirmed by the United States Supreme Court in the Joint Traffic Association Case (Oct., 1898). About three years ago 31 railways joined in an association "to establish and maintain reasonable and just rates, fares, rules, and regulations on State and interstate traffic." The Supreme Court takes the ground that railway pooling agreements are void without regard to their form, any combination to regulate and control rates is unlawful. The railway lawyers attacked the Sherman Anti-Trust Law, but the court sustained its validity. Perhaps the most noteworthy sentence in this important opinion is the following: "The business of a railroad carrier is of a public nature, and in performing it *the carrier is also performing* to a certain extent *a function of government*." Why should functions of government be delegated to corporations to be performed for private gain?

acts granting monopolies as bad or worse, in the shape of franchises and contracts; and the same courts that declare whatever tends to monopoly null and void (and cite Darcey *vs.* Allen, 11 Coke 84 b, and 7 Bac. Abr. 22, authorities dealing with franchises granted by Queen Elizabeth, and stating that all grants creating monopoly are void by the common law), — these same courts sustain the said legislative bodies in the creation of monopolies.

According to these decisions, a gas or street railway monopoly by combination is inherently bad; but the same monopoly, by act of the Legislature and the city council, is perfectly good. A private monopoly by agreement in New York or Philadelphia is absolutely void, because private monopoly is in its very nature contrary to public policy;[1] but a private monopoly by agreement in the State House at Albany, or in the Capitol at Washington, is absolutely good.

The truth is, that decisions sustaining grants of franchises or other monopolistic privileges are contrary to the fundamental principles of free institutions, democratic government, and Anglo-Saxon jurisprudence. No Legislature or Congress ever had a right to grant a monopoly, or a franchise that practically amounts to a monopoly. What

[1] Morris Run Coal Co. *vs* Barclay Coal Co., 68 Pa. St., 173, Craft *vs.* McConoghy, 79 Ill., 346 at 350; Salt Co. *vs.* Guthrie, 35 Ohio St., 666; and cases cited above.

the sovereign power of Queen Elizabeth could not accomplish against the people's interests is surely beyond the rightful power of legislators elected to serve the people's interests. A private monopoly is just as much against public policy when formed by grant as when formed by combination, — more so if anything, because of the corruption of the government so often incident to such grants. The result is, that justice, public policy, and the established principles of our jurisprudence, permit no private monopoly, either by combination or by grant, wherefore monopoly, wherever necessary in the nature of the case, or for the sake of economy, must be public and not private. That every water, gas, electric-light, transit, telegraph, and telephone franchise should be owned and operated by the public is a clear deduction from principles of justice and public policy firmly established in our law for the last five hundred years.

A franchise establishing a virtual monopoly, and relating to a practical necessity of civilized life, like transportation, light, water, means of communication, etc., involves a power to exact tribute from the community,[1] a power substantially equivalent to the privilege of levying taxes for private purposes, which is beyond the authority of any legislative body in a free country.[2] The Legis-

[1] Bradley, J., in Sinking Fund case, 99 U. S., 700, 747.

[2] The government cannot levy taxes nor take private property

lature cannot delegate a power it does not possess, cannot do indirectly through a corporate franchise what it has no right to do directly; wherefore, on the clearest principles of law, every monopolistic franchise our legislators have granted should have been held absolutely void. Such franchises not only involve taxation for private purposes, but taxation without representation — the people who pay tribute to the street-railway, gas and electric companies, are not represented in the deliberations of those bodies. It is a curious spectacle, this of a government choking monopolies with one hand, and granting them in lavish abundance with the other, declaring all the while that monopolies are contrary to public policy, and passing laws to destroy them, while in the very same hall, and perhaps in the very same hour, still other laws are passed to create them.

in any way except for a *public* purpose (20 Wall., 664; 106 U. S., 487; 2 Dill., 353). And taxation for the benefit of an enterprise in *private control* is not for a public, but for a private purpose, and is beyond the sphere of legislative power (27 Ia., 51; 58 Me., 590).

It makes no difference whether the Constitution expressly limits the power of the Legislature to public purposes or not. The provisions of the Constitution are not the only limitations on legislative power. There are others that inhere in the very substance of republican institutions, implied reservations which grow out of the essential nature of all free governments, and underlie the constitutions, being necessary to accomplish the purposes for which the constitutions were established. (U. S. Supreme Court in 20 Wallace *supra;* Judge Dillon in 27 Ia., 51, 25 Ia., 540; see also 39 Pa. St., 73.)

V. REGULATION.

The Right to Regulate Rates and Services.

1. A Legislature may, within the borders of its own State, regulate the use of property and the prices charged for transportation or other service which is "clothed with a public interest." [1] This

[1] Any one who enjoys a special privilege or a virtual monopoly, or has a business that is affected with a public interest, may be regulated. (Cooley on Const. Lims., 734–7; Munn *vs.* People, 69 Ill., 80, 91. Munn *vs.* Ill., 94 U. S., 113.)

"Affected with a public interest" means

(*a*) Any business that is not of common right, but permitted by public authority.

(*b*) When any exclusive privilege is granted.

(*c*) Where the public grants special assistance, use of public property, etc. (Cooley, 738.)

"Property becomes clothed with a public interest when used in a manner to make it of public consequence, and affect the community at large.

"When therefore one devotes his property to a use in which the public has an interest, he in effect grants to the public an interest in that use, and must submit to be controlled by the public for the common good to the extent of the interest he has thus created." (C. J. Waite, 94 U. S., 126, Munn case; Grain Warehouses.)

"Turnpikes, railroads, telephones, telegraphs, are impressed with a public character, and as such are subject to general police regulations." (Elliott on Roads and Streets, p. 59.)

"When a business becomes a practical monopoly, to which the citizen is compelled to resort, and by means of which tribute can be exacted from the community, it is subject to regulation by the legislative power." (Bradley, J., interpreting the Munn case in Sinking Fund case, 99 U. S., 700, 747.)

That monopoly is not the only justification of regulation is shown by the case of bakers, millers, hackmen, etc. The use of property or any other element of conduct may be regulated to

right of regulation is incident to what is known as the "police power" of the State, — the power to provide for the safety, health, comfort, prosperity, and morals of its people. In the exercise of such power, it has been customary from time immemorial in England, and in this country from its first colonization, to regulate hackmen, draymen, ferrymen, bakers, millers, wharfingers, warehousemen, innkeepers, common carriers, etc.; and in so doing to determine the accommodations that shall be furnished, the articles that shall be sold, the charges that shall be made, and any other matters related to the business in which the public has an interest.[1]

2. The Legislature may act directly or through a commission, or in case of local concerns may delegate the power of regulation to municipalities. This is done to a greater or less extent by every State in the Union in respect to hackmen, innkeepers, owners of theaters, saloons, gambling-houses, railways, telegraph and telephone lines, gas, water, electric light, and other street franchises. Sometimes, as in Missouri and California, laws are passed which give the whole control of

whatever extent the public good requires. (143 U. S., 517, 535, Budd case.) That is the sole test — the public good is the supreme law.

[1] See Munn *vs.* Ill., 94 U. S., 113. Where numerous statutes are cited by the chief justice to sustain this proposition; see also Cooley on Const. Lims., 734-5.

rates, as well as service in one or more lines of business, to municipal authorities. In other cases, the Legislature reposes in the city government a limited power of regulating accommodations and service, and confers the power of fixing rates upon State commissions, like the railway commission and the Gas and Electric Light Commission of Massachusetts, boards which act upon petition either of the public or the companies, but which are very unsatisfactory, for several reasons. *First*, they represent centralized bureaucracy instead of local self-government. *Second*, their salaries are paid by the companies, and they are said to be nominated by them. However that may be, they are beyond a doubt, consciously or unconsciously, very largely in sympathy with and under the influence of the companies and their leading officers and attorneys. The commissioners are thrown into close association with these corporate officers and attorneys, who know, as a rule, a great deal more about the business than the commissioners, and have large influence, learning, pleasant manners, and every other means of making themselves attractive; and it is not strange that the commissioners should become quite largely imbued with the ideas of their agreeable associates and paymasters.

3. The prices and rates fixed by legislative authority must not be unreasonably low. The

Federal Constitution will not allow the regulated party to be deprived of his property without due process of law; i.e., without a hearing and judicial proceeding. Except to satisfy a valid claim, his property cannot be taken without a just compensation.

4. The clause of the Constitution which gives Congress control of interstate and foreign commerce does not prevent any State from making regulations in respect to persons and property within its own borders, although such regulations affect interstate and foreign commerce, if Congress has made no laws touching the subject, or if, although Congress has made such laws, there is nothing in them with which the State law conflicts.[1]

[1] The following cases will illustrate the above propositions: — Escanaba Co. *vs.* Chicago, 107 U. S., 678; Gilman *vs.* Philadelphia, 3 Wall., 713; Transportation Co. *vs.* Parkersburg, 107 U. S., at 701; city ordinance regulating wharfage and charges on a vessel plying between Pittsburg and Cincinnati, and belonging to a Virginia company. See further, 94 U. S., 177; *Ibid.*, 113 at 135: and 5 Howard, 504, the original package case of 1847. Compare 125 U. S., 465, March, 1888, the famous recent "Original Package Decision;" also 135 U. S., 100; Act of Congress, Aug. 8, 1890, 26 Statutes, 313 c. 728. In 140 U. S., 545, the Kansas prohibitory laws were held valid. In 118 U. S., 557; 154 U. S., 204; 143 U. S., 517; 162 U. S., 650; 120 U. S., 493; 141 U. S., 47, 58; 116 U. S., 446; 136 U. S., 313, 326–8, and other cases, it will be found on careful reading that wherever State regulations are held invalid as affecting interstate commerce, the real ground of decision is a contract, or an element of discrimination in the law. It was this that formed the basis of decision against the first South Carolina dispensary law. (Scott *vs.* Donald, 165 U. S., 58, 99, 100.)

A State may regulate the sale of oleomargerine; [1] may authorize a city to regulate the burial of the dead; [2] may require electrical companies to file maps with a board of commissioners and to pay the salaries and expenses of the board; [3] may compel a railway company to fence its lines, make wider and better bridges, build a station at a specified place, and stop its trains there,[4] etc., etc.

A State may authorize municipalities to fix the charges of a private water company.[5] In the Spring Valley case, Chief Justice Waite said: —

"Statutes have been passed in many States requiring water companies, gas companies, and other companies of like character, to supply their customers at prices to be fixed by the municipal authorities; and, as an independent proposition, we see no reason why such a regulation is not within the scope of legislative power, unless prohibited by constitutional limitations or valid contract obligations.

"That it is within the power of the government to regulate the prices at which water shall be sold by one who enjoys a virtual monopoly of the sale, we do not doubt." [6]

[1] Plumley *vs.* Mass., 155 U. S., 461.

[2] Brick Pres. Church *vs.* New York, 5 Cowen, 538, 542.

[3] New York *vs.* Squire, 145 U. S., 175.

[4] Minneapolis & St. Louis Ry. *vs.* Emmons, 149 U. S., 364; 32 Conn., 240; 103 Mass., 254.

[5] Spring Valley Water-Works *vs.* Schottler, 110 U. S., 347, 354. There was no question of reasonableness — defendant denied the right to regulate at all.

Field, J., dissented, holding that the State by such action impaired the obligation of contract.

[6] Citing Munn *vs.* Ill., 94 U. S., 113, as having settled that question.

The Legislature has a right to regulate telegraph and telephone companies, fix their rates, prescribe the service they shall render, and prohibit discriminating contracts.[1] Turnpikes are subject to the police power in the fixing of grades, regulation of rates, etc.[2]

The speed, accommodations, and rates of street railways may be regulated under the police power of a State or municipality.[3] A State may order a street railway to remove snow and ice, to number and license cars, to limit the speed of cars, to operate more cars, etc.[4] A statute fixing transfers at 8 cents is good,[5] so is a law limiting ferry tolls collected of street railway passengers,[6] also an Act

[1] Chesapeake, &c., Telegraph Co. *vs.* B. & O. Telegraph Co., 66 Md., 399 (1886); Hockett *vs.* State, 105 Ind., 250. The Indiana Act of April 13, 1885, fixing the rent of a telephone at not over three dollars a month, or $2.50 if more than one phone is rented by the same individual, company, or corporation, is held valid. The company had been charging $11.16 a month. See also 106 Ind. 1; 118 Ind., 194. 207; 66 Md., 399, 414, deciding further that telephone and telegraph companies cannot refuse to perform their accustomed services for any well-behaved person. They cannot discriminate any more than a railway or a hotel; they are, indeed, common carriers of news.

[2] Elliott on Roads and Streets, 58–60.

[3] Buffalo, &c., Ry. *vs.* Railway, 111 N. Y., 132 (1888); 117 Mass., 544; 58 Pa., 119; 95 Ill., 313; 36 Neb., 307; 22 N. J. L. (2 Zab.), 623; 19 Minn., 418.

[4] Frankford, &c., Ry. Co. *vs.* Philadelphia, 58 Pa., 119. Booth on St. Ry. Law, p. 336.

[5] Wakefield *vs.* South Boston R.R. Co., 117 Mass., 544, chap. 381, § 36, Laws of 1871.

[6] Parker *vs.* R.R. Co., 109 Mass., 506.

reducing fares on the Buffalo street railways to 5 cents.[1]

The Legislature has a right to fix rates on street-car lines, though no such power was expressly reserved, and though the charter says, "the directors shall fix rates."[2] In March, 1897, the Indiana Legislature passed an Act providing that "in cities of this State having a population of 100,000 or more, *according to the United States census of 1890*," the street railway fares should not exceed 3 cents. The validity of the Act is now under litigation, not upon any denial of the legislative right to make reasonable regulations as to rates, but on the ground that the law is special legislation contrary to the Indiana Constitution, and is an impairment of the obligation of contract.[3]

[1] Buffalo E. S. R.R. Co. *vs.* B. S. Rd. Co., 111 N.Y., 132, chap. 600, N. Y. Laws, 1875.

[2] Illinois Cent. Rd. Co. *vs.* The People, 95 Ill., 313; the Legislature has a general power to "define, prohibit, and punish extortion," p. 315.

[3] The Indianapolis conflict began by the introduction of a bill to terminate the street-railway charter in 1901. The railway attorney said, "That is not what the people want. The people want lower fares." Then a bill was introduced for 3-cent fares, and it passed. The railway company asked for a Federal injunction, and the Circuit Court granted it, holding the Act unconstitutional. (Central Trust Co. of New York *vs.* Citizens' Street Railway Co., 80 Fed. Rep., 218, April 23, 1897.) In another case the matter came into the Supreme Court of the State, and that court held the Act constitutional. (City of Indianapolis *vs.* Navin, 47 N.E. Rep., 525, June 11, 1897.) In the light of this decision Judge Showalter of the Circuit Court was asked to dissolve the Federal

Upon the principle that control of street railways comes under the police power of a city, Lin-

injunction; but he refused, saying that a Federal court is not bound by a State decision where a question of the impairment of contract is involved. (Central T. Co. *vs.* Citizens' Ry. Co., 82 Fed. Rep., 1, July 22, 1897.) Afterward the matter came before Judge Woods in the Circuit Court of Appeals (City of Indianapolis *vs.* Central Trust Co., 83 Fed. Rep., 529, Dec. 10, 1897), and it has now gone to the United States Supreme Court for final decision.

The grounds stated in the Federal Reports for holding the law unconstitutional are: (1) that it is a special Act, since it applies only to the city of Indianapolis, and never can apply to any other city; and (2) that it impairs the obligation of contract in two ways; *first*, it violates the implied contract between the State and the company, that any repeal or modification of its powers should be by a law in accord with the Constitution of the State, which this is not, because it is special legislation; and *second*, it breaks in upon a contract between the city of Indianapolis and the street railways, by which it was agreed that the latter might charge a 5-cent fare.

The Indiana Supreme Court holds that there is no impairment of any valid contract between the city and the roads, since the city had no authority to make any agreement that could prevent the Legislature from exercising its rights to regulate tolls. The other objection to the law, the main one in the Federal decisions, the Indiana court does not fairly meet. It says, "A law which applies to cities having a population of 100,000 or more, when there is but one such city, but is so framed as to operate in all other cities in the State as they acquire the necessary population, is a general law." That is true; but unfortunately this Indiana Act is not framed in that way. It applies only to "cities in this State having a population of 100,000 or more, according to the United States census of 1890." (Indiana Laws, 1897, p. 201.) Indianapolis is the only city that comes within that clause, or ever can come within it. The Act is as clearly special legislation as if the word Indianapolis were substituted in it for the clause just quoted. Reformers ought to be careful to draw their bills correctly. The question here raised is not a new one, and the law is

coln, Nebraska, fixed street-car rates at 4 rides for 25 cents, and the ordinance was held good.[1]

clear. (Wheeler *vs.* Philadelphia, 77 Pa. St., 338, 349. An Act limited to cities of 300,000 or more population is not special, although there is at present only one city of that population in the State. The law will apply to other cities as they reach the stated limit; see also Ewing *vs.* Hoblitzelle, 85 Mo., 64. But an Ohio Act applying to "cities of the 2d class, over 31,000 population at the last Federal census," was held special. It applied only to Columbus, and the court said it could not apply to any other city. State *vs.* Pugh, 43 Ohio St., at 116; and even this Act was less definite than the Indiana Act. After the 12th census it *might* be held that that was the "last Federal census" within the meaning of the Act, but no such plea could be made in respect to an Act limited to "the census of 1890." That is absolutely definite. There never can be another census of 1890.)

The Federal court is also clearly right in holding that it is not bound by State decisions or interpretations of State constitutions when a question of impairing the obligation of contract is involved. If State decisions as to the *existence* of contract were binding on Federal courts, the guaranties of the National Constitution against impairment of contract could be avoided in any State by a local finding that there was no contract. Whether the Federal judge is also right in holding that there *is* a contract in this case is doubtful. The decision of the Federal Supreme Court is awaited with interest. It is perfectly clear now that such laws should be drawn in general terms that may admit other cities in the future. The words italicized in the text should have been omitted from the Act.

[1] Maxwell, C. J., in Sternberg *vs.* State, 36 Neb., 307, 317 (1893). A city has a right, under the general police power, to fix reasonable rates of transit.

Note by the Editor. — In May, 1898, Judge Seaman, of the United States Circuit Court, decided against an ordinance of the city of Milwaukee reducing street-car fares in that city to 6 tickets for 25 cents, and 25 tickets for $1. (Milwaukee Electric Railway and Light Co. *vs.* City of Milwaukee, Federal Reporter, vol. 87, p. 577.) To quote the decison: —

"Assuming, therefore, without so deciding, that the general

The right of a State to regulate the charges of railroads is well established.[1] In the Wellman

power to fix and regulate the terms and rates to be charged subsists in the municipality, — namely, that by delegation it became vested with and still retains the full extent of legislative power undoubtedly possessed by the State, — there can be no inquiry here as to the wisdom or good policy of exercising the power so delegated; that being a matter of municipal discretion, over which the courts have no right of supervision or review."

The company had $14,250,000 of stock and bonds, and claimed that the price paid for the plant in 1891, when a horse-car line, together with the cost of improvements since, such as the transformation to electricity, had actually cost, for the 143 miles of track, $8,885,644.17, or about $62,000 a mile, but admitted that the whole plant could be duplicated for $5,153,287.76, or $36,037 per mile.

Judge Seaman thought the company entitled to earn dividends on $2,000,000 also, of the preliminary expenditures of the purchase of the plant, thus raising the proper capitalization to about $50,000 per mile, and accepted the estimate of the company *that the reductions of fare would not increase traffic more than expenses*, and that the company during 1894, 1895, and 1896 had not earned over 3.2 per cent on $7,000,000, after providing a proper depreciation fund, and therefore the company could not afford to reduce fares.

[1] Dow *vs.* Beidelman, 125 U. S., 680 (1887); Chicago, &c., Ry. Co. *vs.* Wellman, 143 U. S., 339; see also the Munn and Budd and Nebraska cases *infra*.

In the "Granger Decisions" of the seventies, the United States Supreme Court said that when rates were fixed by the Legislature, not indirectly through a commission, but by direct specification in the law itself, the courts could not question their reasonableness. "For protection against abuses by legislatures, the people must resort to the polls, not to the courts." (See Peik *vs.* Chicago, 94 U. S., at 178; Munn *vs.* Illinois, 94 U. S., at 134; Chicago, B. & O. Rd. *vs.* Iowa, 94 U. S., 155; *Ibid.*, 164, 179.) As a matter of fact, the rates established by the Granger laws appeared to be reasonable, so that the doctrine of legislative supremacy was a dictum, and a very shaky one. To say that courts would not interfere with legislative rates was simply to affirm that there was one way in which a Legislature *could* take private property without just com-

case the Federal Supreme Court said, "The Legislature has power to fix rates, and the extent of judicial interference is protection against unreasonble rates."

If the rates fixed for a State allow *any substantial* margin beyond proper expenses, it is probable that the courts will not interfere; the question what is a reasonable percentage of profit in the given business may perhaps be left to the Legislature. If the rates allow a return equal to that obtained by similar labor and capital in other business, they are clearly reasonable. If the rates will not cover operating expenses, they are clearly unreasonable, and will be enjoined. In respect to this, it is

pensation, and without a hearing — one way in which the courts would allow a Legislature to violate the Federal Constitution. Such a doctrine could not last; and the Supreme Court now holds that the power of regulation is not a power to confiscate or destroy, or to compel the doing of service without reward, or to take property without just compensation or due process of law, or to deny the equal protection of the laws as guaranteed by the Constitution. It is part of the business of courts to prevent legislative abuses of this sort. (See cases cited at the beginning of this note, and also Chicago, M. & St. P. Ry. Co. *vs.* Minnesota, 134 U. S., 418.) In 143 U. S., 546, the court said that if the Legislature left *any* compensation above proper and lawful expenses, the rates would be sustained, the reasonableness of the *margin* being a legislative and not a judicial question. This is probably not quite true. To put a strong case, suppose the statute rates were fairly *tried* to ascertain the effect of increased traffic, etc., and there was a margin of only one hundredth of one per cent on actual investment year after year under honest bookkeeping supervised by the State, it seems hardly possible that the courts would sustain the rates.

a question how far a decision should proceed until the rates have been put into operation a sufficient length of time to determine their effect in increasing traffic.[1]

THE GRAIN ELEVATOR CASES.

In the great case of Munn *vs.* Illinois,[2] the Legislature fixed the maximum charges which the Chicago grain warehouses should make, at 2 cents a bushel for the first 30 days, and ½ a cent a bushel for each 15 days afterward; and the United States Supreme Court sustained the decision of the Illinois Supreme Court in favor of the law, although the warehouses had been built by private capital on private land, and were owned by private persons, and controlled by them in their own private business.

The same principle was sustained in the still greater case of Budd *vs.* New York.[3] The Legislature of New York had fixed the maximum price of elevating, receiving, weighing, and discharging grain by elevators in the cities at ⅝ of a cent per

[1] In the Wellman case the Legislature of Michigan had fixed the maximum passenger rates at 2 cents a mile; and the law was held good, although the company introduced a statement to show that its earnings the previous year had just paid expenses and interest on its debt, leaving nothing for profit. It appeared, however, from the company's report, that its *average* rate the year before was a trifle under 2 cents a mile; and the court further said that even without this fact it could not hold the law unreasonable, since a lowering of rates might increase business and earnings.

[2] 94 U. S., 113. [3] 143 U. S., 517, Feb. 29, 1892.

bushel. The owners of the elevators claimed that such a law was unconstitutional, as taking private property for public use without compensation, and forbidding citizens to make a profit by the use of their property. Again the United States Supreme Court, in a magnificent opinion, sustained the decision of the New York Court of Appeals (117 N. Y., 1) in favor of the law, holding that the State had a right to regulate any business "affected with a public interest;" that is, *any* business, the regulation of which is necessary to subserve the public good.

The language of the court in both cases was, "The government regulates the conduct of its citizens one towards another, and the manner in which each shall use his own property, when such regulation becomes necessary for the public good." [1]

In both cases the court said that there was a *practical monopoly*,[2] and that "when a business becomes a practical monopoly it is subject to regulation by the legislative power." [3]

There is a dissenting opinion in the Budd case, which is important because of the clearness with which it shows that if the principles of the majority opinion are accepted (and they *are* the established principles), then it follows that the Legislature may regulate charges in any business whatever.[4]

[1] 143 U.S., 535. [2] *Ibid.*, 543. [3] *Ibid.*, 537.

[4] The dissenting opinion says, "There is scarcely any property

KANSAS STOCK-YARDS CASE.

The Kansas statute of March 3, 1897, regulating stock-yards, fixing compensation for yarding, feeding, and watering live stock, and fixing a limit for the prices of feed, etc., which allowed a net income of 5.67 per cent annually on the actual value of the property used for stock-yard purposes (or of

in whose use the public has no interest. . . . Surely the matters in which the public has the most interest are the supplies of food and clothing; yet can it be that by reason of this interest the State may fix the price at which the butcher may sell his meat and the shoemaker his shoes? . . . If it may regulate the price of one service, why may it not with equal reason regulate the price of all?" The judge appears to think that this reduces the majority opinion to the absurd, but he gives no reason for denying the power of the State to regulate meat-shops or clothing-houses as well as elevators; and is not easy to see on what ground it can be denied that the State has a right to regulate any other business on the same condition that it may regulate grain elevators; viz., if the public good requires it.

The dissenting justice also says, "The utmost possible liberty to the individual, and the fullest possible protection to him and his property, is both the limitation and the duty of government." Exactly; but which individual is to be protected? — the owner of the elevator, or the man who has to pay an exorbitant fee for his services? — the owner of the coal-mine, or the coal consumer? — the railroad king, or the passenger? If the State stands by while the elevator and the railroad and the coal combine deal unjustly by the merchant, the farmer, the laborer, and the mechanic, is that giving "the fullest possible protection to the citizen and his property," which the dissenting justice says is the "duty of government"? And if the State does not stand idly by, if it does this duty, it must either *regulate* or *buy*, and until it gets ready to buy, it *must* regulate. — Therefore, the principles of the dissenting judge directly lead to the majority opinion from which he imagined that he dissented.

4.24 per cent on its value as expressed in its shares of capital stock at their par value), does not operate to deprive the company (Kansas City Stock-Yards Company) of its property without due process of law, and is not in violation of the Federal Constitution, though it reduces the previous net income nearly 50 per cent.[1]

"When a valuation is placed on property which has become affected with a public use, for the purpose of ascertaining whether the maximum rate of compensation fixed by law for its use is reasonable or otherwise, it is obvious that the income derived therefrom by the owner before it was subjected to legislative control cannot always be accepted as a proper test of value, because the compensation which the owner charged for its use may have been excessive and unreasonable. Again, when property has been capitalized by issuing stock, neither the market value nor the par value of the stock can be accepted in all cases as a proper criterion of value, because the stock may not represent the money actually invested, and, furthermore, because the property may have been capitalized mainly with reference to its income-producing capacity, on the assumption that it is ordinary private property, which the owner may use as he thinks proper, without being subject to legislative control."[2]

THE NEBRASKA DECISION.

We will close this discussion with a consideration of the recent decision of the United States

[1] Cotting *vs.* Kansas City Stock-Yards Co., 82 Fed. Rep., 839, Oct. 4, 1897; *Ibid.*, 850, Oct. 28, 1897. [2] *Ibid.*, at p. 854.

Supreme Court in Smyth *vs.* Ames, commonly known as the Nebraska Decision.[1] The Nebraska Legislature passed an Act fixing maximum rates for the transportation of freight by railroad between any two points in the State, embodying full tables of classification and rates in the statute, and authorizing and directing the board of transportation to reduce rates still further on any class of commodity whenever it should seem just and reasonable to a majority of the board to do so. The railroads claimed that the statute rates would bring their income on local traffic below their local operating expenses. The Circuit Court,[2] on proof to this effect, issued an injunction against the enforcement of the statute, adding that "the board of transportation of said State may hereafter, where the circumstances have changed so that the rates fixed in said Act shall yield to the said companies reasonable compensation for the services aforesaid, apply to this court by supplemental bill or otherwise, as they may be advised, for a further order in that behalf."

Upon appeal to the Supreme Court the Circuit judgment was sustained. The evidence satisfied the Supreme Court that "the average reduction made by the statute on all the 'commodities of

[1] Smyth *vs.* Ames, 169 U.S., 466, March 7, 1898; 18 Sup. Ct. Rep., 418; 171 U. S., 361, May 31, 1898; Laws of Neb., 1893, p. 164, chap. 24.

[2] 64 Fed. Rep., 165, Justice Brewer presiding.

local rates' was 29.50 per cent;" that "the percentage of operating expenses on local business would exceed the percentage of operating expenses on all business by at least 10 per cent, and it might go as high as 20 per cent or higher;" and that, upon 5 out of the 7 roads involved,[1] the percentage of operating expenses to earnings on all business ranged from 62 per cent to 99 per cent for the three years preceding the Act (in one case the Omaha Co., 1891, going as high as 120 per cent). Adding 10 per cent to get the ratio of local operating expenses to local earnings, the court found percentages varying from 72 to 130; whereupon it was clear that the statute reduction of earnings on local business by 29.50 per cent,

[1] Under the statute rates the Fremont road would have gained 10.63 per cent above operating expenses in 1891, lost 10.21 per cent in 1892, and gained 6.84 per cent in 1893 — assuming that the traffic would have been no larger under statute rates. The Union Pacific would have lost 8.44 per cent in 1891, gained 4.06 per cent 1892, and 2 per cent in 1893. The other companies — Burlington Company, St. Paul Company, Omaha Company, St. Joe Company, and Kansas City Company — would have lost in all three years on the said assumption.

It was contended that even if the companies did lose on local business, their profits on through business would more than make up the loss. The court admitted this, but held that local rates could not be reduced below the cost of local business, no matter what profits might arise from other sources.

Congress had reserved power to fix rates on the Union Pacific; but the Supreme Court held that "until Congress prescribes the rates, it remains with the States through which the road passes to fix rates for transportation beginning and ending within their respective limits."

leaving only 70.50 per cent, would bring the local earnings below the local operating expenses; and of course a statute requiring any road to do business below cost must be declared void, under the Fourteenth Amendment to the Federal Constitution, providing that no State shall deprive any person of property without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws.[1]

It must be noted that the increase of local railway traffic likely to result from lower rates does not seem to have been taken into account. In the majority of cases it would be very difficult to say that the increase of traffic that might come with lower rates would not be sufficient to make the new rates yield a profit. This principle was recognized in the Wellman case.

[1] The court said it was settled that a corporation is a "person" within the Amendment (118 U. S., 394, 396; 142 U. S., 386, 391; 165 U. S., 150, 154); and proceeded to quote Chief Justice Waite to the effect that while a State may fix internal railway charges unless restrained by valid contract or its action amounts to a regulation of interstate or foreign commerce, yet it must be remembered that "under pretense of regulating fares and freights, the State cannot require a railroad corporation to carry persons or property without reward." Again, "If the company is deprived of the power of charging reasonable rates for the use of its property, and such deprivation takes place in the absence of an investigation by judicial machinery, it is deprived of the lawful use of its property, and thus, in substance and effect, of the property itself, without due process of law, and in violation of the Constitution of the United States; and, in so far as it is thus deprived, while other persons are permitted to receive reasonable profits upon their invested capital, the company is deprived of the equal protection of the laws."

It is fair in such legislation to make the reduced rates apply only to companies realizing a specified profit, say 5 per cent on the real investment above operating cost and depreciation. And it might be a good thing for the State of Nebraska to offer to guarantee the roads against loss during a year or two of experiment with the statute rates, and use its police power to compel the companies to keep their accounts under State supervision, so that the Legislature and the people and the courts could become acquainted with the facts to a certainty, and the possible entry of construction cost, and lobby expenses, etc., under operating expenses, might be guarded against. It may be that very effective work might be done in this way. The public supervision of railway bookkeeping, if persistent and thorough, would accomplish much, even without a guaranteed experiment of lower rates. Another thing Nebraska can do is to enact a new law, reducing rates 10 per cent instead of 29½ per cent, and providing that the reduction shall take effect only on roads where the local earnings have exceeded the local operating expenses by 15 per cent during the two or three preceding years. Or a margin of perhaps 5 per cent profit above operating expenses and depreciation might be provided for. That is, the accounts being under thorough State supervision, the statute rates might be made to apply only where the rec-

ords of the past few years indicate that they will yield 5 per cent profit on the actual value of that proportion of the plant which is referable to local business, making allowance in the calculation for the probable effect of lowered rates upon the increase of traffic. Or a sliding-scale of rates might be adopted; roads making 5 per cent to reduce charges by a small specified percentage, those making 8 per cent to lower charges by a somewhat larger percentage, those making 10 per cent to lower charges still more, and so on.

There was evidence before the court that the local rates in Nebraska are 40 per cent higher than in Iowa, and that the rates enacted in the Nebraska statute would still leave Nebraska local rates much higher than those of Iowa. There are, however, 230 people per mile of road in Iowa, and only 190 people per mile in Nebraska; and the mileage earnings in Iowa, in spite of the low rates, are greater than in Nebraska. In view of this, and in face of the direct evidence as to Nebraska's earnings and expenses, the court could not lay much weight on such analogies between State and State. The thing to do is to probe the matter to the bottom in every State by opening railway bookkeeping to public inspection. Railways are quasi-public institutions; the public is a partner, supplying the franchises, often the most valuable portion of the properties involved, and it ought to

have the privilege of inspecting all accounts, and understanding in full all the partnership affairs.

The Nebraska case has been criticised in some quarters as a corporation decision, but I do not think any one can read the opinion carefully without feeling that the Federal courts acted in perfect good faith and with strong reason. A sweeping law that, according to the evidence before the court, would compel some roads to do business below the cost of operation could not reasonably be sustained. The law was not properly drawn, or else the evidence was imperfect. A reduction of rates not unreasonable on the facts proved in court will be sustained. The Supreme Court emphatically declared that although a State could not compel a railway to carry freight below cost, yet on the other hand a railroad could not demand the privilege of collecting rates beyond those needed to pay operating expenses and a reasonable return on the fair value of the property involved; it could not impose on the public the burden of a profit on fictitious capitalization. Upon this important point the language of the court is as follows: —

"In the discussion the plaintiffs contended that a railroad company is entitled to exact such charges for transportation as will enable it at all times not only to pay operating expenses, but also to meet the interest regularly accruing upon all its outstanding obligations, and justify a dividend upon all its stock; and that to prohibit it from

maintaining rates or charges for transportation adequate to all those ends will deprive it of its property without due process of law, and deny to it the equal protection of the laws. This contention was the subject of elaborate discussion; and as it bears upon each case in its important aspects, it should not be passed without examination.

"In our opinion, the broad proposition advanced by counsel involves some misconception of the relations between the public and a railroad corporation. It is unsound in that it practically excludes from consideration the fair value of the property used, omits altogether any consideration of the right of the public to be exempt from unreasonable exactions, and makes the interest of the corporation maintaining a public highway the sole test in determining whether the rates established by or for it are such as may be rightly prescribed as between it and the public. A railroad is a public highway, and none the less so because constructed and maintained through the agency of a corporation deriving its existence and powers from the State. Such a corporation was created for public purposes. *It performs a function of the State.* Its authority to exercise the right of eminent domain and to charge tolls was given primarily for the benefit of the public. It is under governmental control, though such control must be exercised with due regard to the guaranties for the protection of its property. It cannot, therefore, be admitted that a railroad corporation maintaining a highway under the authority of the State may fix its rates with a view solely to its own interests, and ignore the rights of the public. But the rights of the public would be ignored if rates for the transportation of persons or property on a railroad are exacted without reference to the fair value of the property used for the public, or the fair value of the services rendered; but in order simply that the corporation may meet operating

expenses, pay the interest on its obligations, and declare a dividend to stockholders.

"*If a railroad corporation has bonded its property for an amount that exceeds its fair value, or if its capitalization is largely fictitious, it may not impose upon the public the burden of such increased rates as may be required for the purpose of realizing profits upon such excessive valuation or fictitious capitalization;* and the apparent value of the property and franchises used by the corporation as represented by its stocks, bonds, and obligations, is not alone to be considered when determining the rates that may be reasonably charged. What was said in Turnpike Co. *vs.* Sandford, 164 U. S., 578, 596–597, is pertinent to the question under consideration. It was there observed, 'It cannot be said that a corporation is entitled, as of right, and without reference to the interests of the public, to realize a given per cent upon its capital stock. When the question arises whether the Legislature has exceeded its constitutional power in prescribing rates to be charged by a corporation controlling a public highway, stockholders are not the only persons whose rights or interests are to be considered. The rights of the public are not to be ignored. It is alleged here that the rates prescribed are unreasonable and unjust to the company and its stockholders. But that involves an inquiry as to what is reasonable and just for the public. . . . The public cannot properly be subjected to unreasonable rates in order simply that stockholders may earn dividends. The Legislature has the authority in every case, where its power has not been restrained by contract, to proceed upon the ground that the public may not rightfully be required to submit to unreasonable exactions for the use of a public highway established and maintained under legislative authority. If a corporation cannot maintain such a highway and earn dividends for stockholders, it

is a misfortune for it and them which the Constitution does not require to be remedied by imposing unjust burdens upon the public. So that the right of the public to use the defendant's turnpike upon the payment of such tolls as, in view of the nature and value of the services rendered by the company, are reasonable, is an element in the general inquiry whether the rates established by law are unjust and unreasonable.'

"We hold, therefore, that the basis of all calculations as to the reasonableness of rates to be charged by a corporation maintaining a highway under legislative sanction must be the fair value of the property being used by it for the convenience of the public. And, in order to ascertain that value, the original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stock, the present as compared with the original cost of construction, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property. What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience. On the other hand, what the public is entitled to demand is that no more be exacted from it for the use of a public highway than the services rendered by it are reasonably worth."[1]

[1] The court quoted from the Nebraska State Board of Transportation of 1891 to the effect that "the railroads in this State could not be duplicated for a less sum than $30,000 per mile, taking into consideration equipments and depot and terminal facilities." The Board expressed the opinion that the roads could not stand any cut of local rates, even figuring their property "at $30,000 per

The Supreme Court closed its opinion as follows:—

"In anticipation, perhaps, of such a change of circumstances, and the exceptional character of the litigation, the circuit court wisely provided in its final decree that the defendant members of the Board of Transportation might, 'when the circumstances have changed so that the rates fixed in the said Act of 1893 shall yield to the said companies reasonable compensation for the services aforesaid,' apply to the court, by bill or otherwise, as they might be advised, for a further order in that behalf. Of this provision of the final decree the State Board of Transportation, if so advised, can avail itself. In that event, if the circuit court finds that the present condition of business is such as to admit of the application of the statute to the railroad companies in question without depriving them of just compensation, it will be its duty to discharge the injunction heretofore granted, and to make whatever order is necessary to remove any obstruction placed by the decrees in these cases in the way of the enforcement of the statute."[1]

mile, and not what they claimed they cost." The Board also said they believed a cut in local rates would result in a rise of through rates, as had been the result of a 60 per cent reduction in the local rates on coal, "the price to the consumer was not lowered nor the price at the mines raised."

[1] The injunction granted in the court below contained clauses enjoining the roads from making any reduction at all in their rates. At a hearing in May, the Supreme Court ordered these clauses stricken out of the decree, 171 U.S., 361.

VII.

STREET RAILWAYS.

STREET RAILWAYS.

By EDWARD W. BEMIS.

In 1880 there were only 2,050 miles of street-railway track in the United States, counting a mile of double track as two miles of single track. There were no electric roads, and only three cable roads, the first dating from 1877. At the close of 1885 there were only 11 cable roads and no electric roads in America. Two electric roads were built in 1886, and six in 1887. Because the franchise of a street railway in Richmond, Va., permitted the adoption of any form of traction, that city was selected to prove the practicability of electric cars for a whole street-railway system, with its curves and grades. On June 30, 1890, there were 144 electric roads, 48 cable roads, and 597 other street railways in this country. The electric roads had 914 miles of track, the cable roads had 283, the steam dummy lines 524, and those with horse or mule traction 4,062 miles.

The estimated cost of these roads, by which was probably meant the outstanding securities,

according to the census, was $389,357,289, and the employees were 70,764. In September, 1898, the president of the New York Street Railway Association, in his annual address, estimated the present street railways as having over 16,000 miles of track, 170,000 employees, and an "invested capital" of over $850,000,000. The American Street Railway Directory,[1] issued at about the same time, gave some statistics of 909 electric roads with 14,674 miles of track, 21 cable roads with 486 miles, 31 steam dummy lines with 618 miles, and 113 horse-car lines with 689 miles of track. These 1,074 roads, with 16,467 miles of track, had $1,507,596,047 of stock and bonds outstanding, or over $91,000 per mile, and had 48,209 cars, or about three per mile.

It is the estimate of a carefully prepared article in *The Street Railway Journal* for October, 1897, that the American street railways are now earning "at least $150,000,000 gross; and it is probable that the net earnings applicable to return on investment as figured by the companies themselves would be between 40 and 50 million dollars."[2]

[1] Published at 150 Nassau Street, New York City.

[2] In confirmation of this estimate of $150,000,000 of annual business, it may be noted that the street-railway receipts in 1896 in the three States of Massachusetts, New York, and Pennsylvania, were $63,881,598, although these States had less than one-third of the total street-railway mileage of the country. Four cities in other States — Chicago, St. Louis, San Francisco, and Cincinnati — would have raised the total gross receipts to over

The rapidly developing magnitude of this form of transportation may be illustrated by a comparison with the steam railroads of the country. The passenger earnings upon the latter, for the year ending June 30, 1897, were $314,859,516, according to the Interstate Commerce Commission, or but little over twice the receipts of the street railways. The passengers carried upon our steam railroads in 1897–1898 paid an average of 50 cents for an average ride of 24.8 miles. The number of passengers upon the street railways must have exceeded the number on the steam roads at least five-fold, in order to have produced a revenue of one-half that received by the latter from its passenger business. The net income from operation per mile of track, above operating expenses, for all kinds of traffic upon the steam railroads during 1896–1897, was $2,050, and upon the street railways about $3,300. This will explain why it is that the street railways float stock and bonds of over $90,000 per mile, while the steam roads, with all their watered stock, have only $59,610 per mile.

It may be further noted that the street railways have twice as many passenger-cars as the steam railroads.[1]

$90,000,000; and there are fully 25 other large cities with total gross receipts of over $25,000,000.

[1] The latter had 25,275 on June 30, 1898, according to the report of the Interstate Commerce Commission; and the former were running 48,209 cars, as above stated.

The average number of employees of the street railways — about 170,000 — is one-fifth of the number employed in both passenger and freight traffic upon the steam roads.

The street railroads are fast outstripping the steam roads in their growth. Between 1887 and 1896 the gross income of the street railways of New York State increased 60.38 per cent, while the increase in the case of the steam railroads was only 46.09 per cent.[1] In Massachusetts for the same time the percentages of growth were 132.6 and 60.4 respectively. Similar figures could be quoted for other States.

Every one admits the benefits of the rapid extension of street railways. They are revolutionizing life in our cities by enabling an enormous population to have homes in healthy and pleasant suburbs.

A resident of Hull House, Chicago, in one of the great centers of Chicago poverty, remarks that the workers at the settlement had labored for years with only moderate success to secure better sanitary conditions for the foreign-born population about them, when suddenly street-railway extensions induced 5,000 of the people to move to healthful suburbs. It is with full recognition of the benefits of our street railroads that one may still call attention to possible improvements.

[1] See *Street Railway Journal*, October, 1897.

PROFITS.

It is established beyond question that these railways are an absolute monopoly so far as competition with other railroads is concerned, although the bicycle has proved a considerable check upon railway profits. Elevated roads in the few cities large enough to justify them are tending to consolidation with the surface lines, as already accomplished in Boston, and virtually achieved in a considerable portion of Chicago.

It would be expecting too much to count upon the refusal of so complete a monopoly to make the most of its opportunities for profits far in excess of those secured in competitive business. It is rather the fault of communities, if they allow the earning of monopoly profits by corporations receiving the gift of the public streets.

The street railway business requires far less managerial ability than almost any other kind of business of the same magnitude; since there are no competitors to fear, and no questions as to the precise shade of color or quality of wares that will best meet the fastidious taste of the buyer in a competitive market. The simple, plain service of transportation is the only thing to be furnished. Scarcely such a thing as good will may be said to exist in the ordinary commercial sense, except in dealings with the city government. People will

ride and must ride, whether they like a company or hate it. One might reasonably expect, therefore, under proper relations between the people and these railway companies, that their profits would be as much less than those of the average cotton-mill as their risks and requirement of ability are inferior to those demanded by the latter. No underestimate of the purely engineering abilities required for the development of various forms of electric traction is here intended, but payment for such abilities is mostly reckoned in the salary list as part of the operating expenses rather than of the profits.

To be sure, the profits of street railways, especially of those that introduced cable or electric traction before the great fall in prices in those lines about 1893, are much less than would at first sight appear. Boards of directors are responsible for this current impression. They have often paid in large dividends upon a grossly inflated capitalization what should have been reserved as a depreciation and sinking-fund for the reduction of the capital account and the changes in motive power to conform with changes in structural values and with the development of invention. Now, however, that some stability in the price of electric equipment has begun to appear, it is the opinion of a very able, though unsigned, article in the *Street Railway Journal* for April, 1897, that the

official reports of the operating expenses of all the street railways of Massachusetts, New York, and Pennsylvania, although perhaps not always including sufficient allowance for depreciation, are yet as great as would be the cost of street-railway transportation, even if depreciation were added, if the equipment were all thoroughly modern. The statement is worth quoting verbatim.

"It is difficult to say what additions should be made to the operating expenses as reported officially, in order to obtain approximately correct figures for depreciation; but it is probably true that with the best modern road-bed and equipment known to-day, an equal car-service could be given on the same track mileage, and all allowances made for depreciation on a conservative basis, at figures little, if any, greater than those quoted here,"

i.e., than the figures in the State reports, and in the annual volume known as *American Street Railway Investments*.

The leading writer upon street railway questions in America, and an acknowledged authority, Mr. Edward E. Higgins, declared in 1895, in his book on Street Railway Investments (p. 77), that in cities of 100,000 to 500,000 inhabitants, net earnings of 15 to 25 per cent "on the actual net cost of duplicating the tangible assets" were to be expected.

With respect to street railways in still larger cities, Mr. Higgins writes: —

"The properties in this class are among the safest and most profitable in the entire range of capital investment. Defaults in interest charges are almost unknown; and dividends on stocks have been, with few exceptions, regular and satisfactory, in spite of extreme over-capitalization of costs" (p. 81).

Professor Frederick W. Speirs of the Drexel Institute, Philadelphia, in his book on The Street Railway System of Philadelphia,[1] states (p. 43): —

"The present market value of the stock of all the street railway companies of Philadelphia exceeds $120,000,000; the amount of paid capital stock, including that of the Traction Company, being in the vicinity of $50,000,000; while the total cost of the construction and equipment of the roads which the stocks represent is about $36,000,000."

He shows that after deducting the large amount, about $20,000 per mile, required for paving the streets from curb to curb, as the law compels in Philadelphia, the companies reported to the State a cost of construction of only $56,300 per mile for the 447 miles of track. The comparison between the total cost, with paving, of $76,400 per mile, with the capitalization of $242,280 per mile, is certainly interesting; yet this was then exceeded, according to Professor Speirs, by three other surface railways as follows: —

[1] Published in 1897, by the Johns Hopkins University Press.

Name of Company.	*Miles of Track.*	*Total Capitalization.*	*Capitalization per Mile.*
Union Traction Company, Philadelphia,	447	$108,301,800	$242,200
Metropolitan, New York,	189	54,884,000	280,900
Capital Traction Company, Washington, D.C.,	36	12,000,000	333,300
Third Avenue Company, New York,	28	14,000,000	500,000[1]

There is reason for larger costs of construction in New York and Washington than in Philadelphia, although most of Philadelphia's streets are too narrow for double track and for the economies connected therewith. On the other hand, the cost in Philadelphia, as reported to the Pennsylvania Secretary of State, is doubtless original cost, and therefore is much higher than the present cost of duplication. In the "Report of the Special Committee of the City Council on the Street Railways of Chicago," commonly called the Harlan Report, published in 1898, figures are given illustrative of the high profits and over-capitalization of the three great systems of that city, — the Chicago City Railway on the South Side, the North Chicago Street Railroad on the North Side, and the West Chicago Street Railroad on the West Side. As these figures are largely based on the report of the writer to the Illinois Bureau of Labor Statistics for 1896, which has never been seriously disputed, they may be taken as approximately correct. It appears that

[1] Professor Speirs gives it $493,000, evidently a misprint.

the 487 miles of street railway in these three systems which can be duplicated for about $59,250 per mile, or $28,858,234, have outstanding securities of a par value of $63,258,300, and of a market value of $91,612,445.

As an interesting side light upon the amount of water in these companies, reference may be made to the report of Mr. F. S. Pearson, the well-known engineer of the Metropolitan Railway Company of New York, to the city of Liverpool, upon the cost in 1897 of a complete new street-railway system of the very highest character. He estimated that an overhead electric line of 70 miles of track and 300 cars, or 4.3 cars per mile, with rails of the unusual weight of 110 lbs. to the yard, throughout, would cost, aside from land, £911,000, or $63,248 per mile. An increase of the cars to 400, or 5.7 per mile, would increase the cost to about $70,000. He estimated that a road of 120 miles and with 400 cars, or with 3 cars per mile, could be built for £1,329,000, or $52,825 per mile. He also estimated that a road of 70 miles, with slotted conduit system, — i.e., with the trolley wire in a conduit underneath the track, — would cost, with 300 cars, £1,285,500, or $89,250 per mile, and about $7,000 more per mile for 400 cars; while a road of 120 miles and 400 cars could be built, aside from land, for £1,917,000, or $77,639 per mile.

The track and equipment of many of the street-

railway lines in our largest cities are very much inferior to the system proposed for Liverpool, in weight of rail, size of car, etc., while in New York City many of the lines are cheap horse-car lines. Aside from the Broadway cable line of New York City, and some underground electric conduit systems, few American companies would require for duplication more than $75,000 a mile; and outside of New York, Washington, and Boston very few indeed would require more than $50,000 a mile, even including the value of the land needed for power and car houses. In cities below 100,000 in population, existing lines could be duplicated usually for $20,000 to $45,000 per mile, according to the character of the road-bed, amount of equipment, etc. These figures are based on full and official data of many companies which the writer has been permitted to examine.

In 1896 Mr. William R. Hopkins, Ph.D., an attorney and a member of the City Council of Cleveland, Ohio, in a valuable work published by the American Economic Association on "The Street Railway Problem of Cleveland," estimated that the 180 miles of street railway in that city could be duplicated for $39,144 per mile, or a total of $7,045,874.[1] Yet in 1896 the joint capital of the Cleveland City Railway Company and the

[1] Dr. Hopkins gives $6,974,403, but his items of cost summarize as in text.

Cleveland Electric Railway Company, he finds to be $24,549,000, or about $136,000 per mile.

As a result of the large profits of street railways, there has come a demand for lower fares and larger taxes, while out of the monopolistic character of this necessity of modern city life, and the absolute dependence of the business on public grants of power in the streets, have come the most demoralizing relations with city and State governments. Of these two problems, — the financial and the political, — the latter is by far the worst. Until it is solved, good municipal government is an impossibility. Only Massachusetts and some parts of Europe have done much toward a solution.

From several American cities, however, something can be learned as to the possibility of low fares or large taxes. From Massachusetts very valuable lessons can be learned as to how to keep down capitalization, and so render further measures of public control easier. Finally, from Germany may be learned what sort of franchises should be granted, and from England how the most satisfactory of all solutions, where practicable, — public ownership and operation, — is now rapidly coming to the front.[1]

[1] In preparing this review, which must be brief, much use has been made of the reports of cities referred to, the reports since 1885 of the Massachusetts Railroad Commission, the annual

Baltimore.

On July 12, 1859, the first Baltimore horse-car was run; and Mayor Swann induced the Council to insist on five-cent fares, free transfers, a $20 tax annually on each car in regular service, and a payment of one-fifth of the gross receipts to the city for a grand boulevard or public parks. During the war the rates of fare were raised, and afterwards the companies refused to reduce to five cents unless the State Legislature would reduce the park tax from 20 per cent to 9 per cent on gross receipts, which was done. The local Legislature also reduced the car license from $20 to $5. The city, nevertheless, secured $248,000 of revenue from the business of the companies in the

"American Street Railway Investments," published by The Street Railway Publishing Company, Havemeyer Building (New York City); Garcke's Manual of (British) Electrical Undertakings, for 1898 (P. S. King & Sons, London); the (British) Municipal Year Book for 1897 and for 1898 (Edward Lloyd, 12 Salisbury Square, London); *London*, the well-known organ of the British municipal movement; *The Street Railway Journal* (New York); special studies, such as the articles in *Municipal Affairs* for September, 1897, by John De Witt Warner and Edward E. Higgins, and others on Philadelphia, Cleveland, Chicago, etc., mentioned in their appropriate places; and last, but by no means least, the recent report of the Massachusetts Special Committee, appointed by Governor Wolcott to investigate the street-railway question in America and Europe. Although the report is in many places very misleading, and biased against municipal operation or low fares, it is the fullest survey of the whole subject that we have. Its summary of American and European franchise law in Appendices A and D is especially useful to the investigator.

old city limits in 1897. In certain large annexed portions of the city, the rate is only six-tenths of one per cent, until 1900, when, by the universal application of the nine per cent tax, the total park revenue will be considerably increased.

Commenting on this, the Special Committee of Massachusetts appointed to investigate the street-railway question, reported in February, 1898, that no city on this continent had received cash returns from its railways approaching that of Baltimore. The committee declared that it would venture no predictions as to the ability of the Baltimore companies to pay the tax, but it makes the following statement: [1] —

"Those representing the railway companies state that the financial burdens imposed by the municipality are unreasonably heavy; that when it is required to renew their equipment, it will be impossible for them to pay such heavy tax burdens. One company, the Baltimore Consolidated, paid last year less than two per cent dividends on a capitalization of $8,000,000. Those interested in Baltimore railway properties stated that, unless the business should increase very largely, the railway companies ought not to be expected to pay such heavy returns to the municipality."

This statement illustrates the bias, or what some would call the "conservatism," of this

[1] "Report of the Special Committee Appointed to Investigate the Relation between Cities and Towns and Street Railway Companies," pp. 114–115. This report will henceforth be designated The Massachusetts Special Street Railway Report.

famous committee, as a little examination will show. It is true that the Baltimore Consolidated Railway Company paid only two per cent on its stock in 1896, although it earned 3.6 per cent in 1897, and is likely to earn still more in the future, because the per cent of operating expenses to gross receipts fell from 51.9 in 1896 to 44 in 1897. But the important facts not stated by the Massachusetts Committee are that the company earns and pays interest on about $58,000 of bonds per mile of track. That it does not earn large dividends on nearly $50,700 a mile of stock is not strange when we consider that the road does 20 per cent less business, and presumably runs about 20 per cent less car-miles per mile of track, than the Springfield (Mass.), Railway, which can be duplicated for under $32,000 per mile. The equipment in cars of the Baltimore road is only 50 per cent more per mile than that of the Springfield road. It certainly cannot complain, therefore, if it earns from 5 per cent to 6 per cent on $58,000 of bonds, and 2 per cent to 4 per cent on $50,000 more of stock.

Why, moreover, did the Massachusetts Special Report omit all reference to the other great Baltimore road, the Baltimore City Passenger Railway Company, which, in addition to interest on $52,766 of bonds per mile of track, has averaged ever since 1896 more than 10.5 per cent dividends on as

much more of stock, aside from a 25 per cent stock dividend in 1894? Its percentage of operating expenses to gross receipts, consequent upon the introduction of electric traction, fell from 83.9 per cent in 1893 to 62.4 per cent in 1897, or one cent per passenger.

Philadelphia.

In seeking for valuable lessons from such American cities as can furnish such, attention is attracted to Philadelphia. Although the State law places no restrictions upon the length of life of street railways, it requires companies to get the consent of the city government before constructing their roads. Ever since the first roads were constructed in 1857, all Philadelphia railways, when applying for franchises, have been forced to agree to observe all ordinances made by the city for their regulation. In many cases special reference has been made to an ordinance of 1857. It is, therefore, the opinion of the leading student of the Philadelphia situation, who has been quoted already, Professor Speirs of Drexel Institute, that all franchises are subject to the ordinance of 1857, which has never been repealed, and which provides relative to certain franchises then up for consideration. "The city of Philadelphia reserves the right at any time to purchase the same by paying

the original cost of said road or roads and cars at the fair valuation; and any such company or companies refusing to consent to such purchase shall forfeit all privileges, rights, or immunities they may have acquired in the use or possession of any of the highways aforesaid." The law committee of the City Councils, as the upper and lower branch of the Legislative Department are called, thus reported recently: [1] —

"It is a fact that Section 8 of the ordinance of 1857 has stood there unchallenged, unamended, unrepealed. As each road has been granted additional privileges by Councils, it has, by its own agreement, made itself amenable and liable to its provisions. It is an integral part of every grant to occupy a street for railway purposes. Every dollar that has been spent upon every railroad in Philadelphia has been spent with full knowledge of its existence. Changes in corporations have taken place, new companies have been formed under new laws, improved methods of transit adopted, new systems of pavement introduced; some of the companies have filed statements of cost as required by it, and all subject to this apparently plain, direct contract with the city of Philadelphia, that they should surrender all under the conditions of the Section. A magic spell seems to have been over all for nearly forty years, — railway managers and city officials alike, — to have permitted so far-reaching and important an enactment to lie totally neglected and apparently forgotten."

Commenting on the condition of affairs, Professor Speirs thus writes: —

[1] "Street Railway System of Philadelphia," by Speirs, p. 90.

"In view of the large financial interest involved, it is apparent that when the interpretation of the clause is demanded from the courts, the resources of legal subtlety will be exhausted in the attempt to secure a decision denying the right of purchase, or imposing terms that will make it impossible for the city to realize the advantages of lower fare."

In the year ending June 30, 1898, this, the largest street-railway property in the world, had gross receipts of $10,860,542 on its 450 miles of track, or $24,134 per mile. After paying in licenses and taxes $894,737, or 8.2 per cent of its receipts, this company had total operating expenses of only 49.27 per cent of its receipts. The net receipts thus for depreciation and profit were $12,243 a mile, or over 20 per cent on the probable cost of duplication.

New York City.

New York City franchises have been so fully described in Chapter V. that only the most recent facts need be cited. In *The Street Railway Journal* for November, 1898, is given a valuable official summary of the results of the recent introduction of the underground electric conduit system. In the three months ending Sept. 30, 1898, substantially an equal amount of traffic — about $1,000,000 worth — was carried over the horse, the electric,

and the cable railways of the Metropolitan system, although the receipts were $39,000 a mile on the cable roads, $17,000 a mile on the electric, and $8,000 on the horse-car lines. Handicapped as were the electric lines in comparison with the cable, the former had operating expenses of only 38.6 per cent of the receipts, the cable 52.7 per cent of the receipts, and the horse-car lines 62.1 per cent, or an average for all of 50.9 per cent. In other words, the underground electric system in New York will carry a passenger for 1.93 cents, aside from fixed charges, the cable for 2.64 cents, and the horse-cars for 3.1 cents. The receipts and expenditures per car-mile were as follows:—

	Receipts, per Car-Mile.	*Operating Expenses per Car-Mile.*
Cable,	33.27	17.55
Electric,	26.03	10.06
Horse-car,	28.82	17.89

The engineer of this company, Mr. F. S. Pearson, in his report to Liverpool already quoted, estimated the operating cost per car-mile of the electric conduit system as 8 cents, and of the overhead trolley system as 7.36 cents per car-mile. The operating expenses in New York are thus only one-fourth more than Mr. Pearson's estimate for Liverpool, and the difference between the expense of operation of the trolley and the conduit is only about 8 per cent. He estimated, however,

as already shown, that the cost of construction of the latter was about 40 per cent greater.

The excess of gross receipts above operating expenses aside from taxes was $10,784 per mile of track in 1893, and $27,696 in 1897; while the taxes the latter year were $2,507 in this Metropolitan system, which includes four-fifths of the surface mileage of the city.

But it does not include the most heavily capitalized, independent road in America, the Third Avenue, whose 28 miles of cable earn for the owners 5 per cent on $5,000,000 of bonds, i.e., on $175,439 a mile; and 8 to 10 per cent yearly on $10,000,000 of stock, i.e., on $350,877 a mile. The excess of receipts over operating expenses and taxes — the latter being only 4 per cent of the receipts — permits this tremendous capitalization of $526,316 per mile, for the net earnings in 1897 were $38,422 per mile.

The 10.2 miles of track of the Broadway cable line belongs to the Metropolitan Company. The Broadway capitalization exceeds that of the Third Avenue, being $1,151,962 per mile, and is undoubtedly the most profitable surface line in the world.

Mr. Robert P. Porter, in Appendix E of the Massachusetts Special Street Railway Report, asserts that the average fare on the Metropolitan system is "about three and three-quarters cents

per passenger, after taking into account the transfers," and says this would not carry much over three miles in Glasgow. But every New York passenger, whether he wishes a transfer or not, must pay five cents, for which in the Scotch city one can ride between four and five miles, or much farther probably than the average ride in New York, where a large portion of the surface railway traffic is under three miles.

Washington, D.C.

The chief advances made by Washington, and they are noteworthy, are in the Act of Congress of June 10, 1896, providing for free transfers among the companies in the District of Columbia, the sale of six tickets for 25 cents, prohibition of horse and overhead wires, sale of all new stock at the market price, and as in the case of bonds, to pay merely for extensions or change of motive power, for the grooved rail everywhere on a level with the pavement, and for an annual report, sworn to by the president and treasurer of each railway, to the Senate and to the House of Representatives, before Feb. 1 of each year, relative to the previous calendar year. The items which this report must contain are so important as to deserve a place here.

"Such report shall state the amount of capital stock, with a list of the stockholders and the amount of stock held

by each; the amount of capital stock paid in; the total amount of funded debt; the amount of floating debt; amount of dividends declared; cost of road-bed and superstructure, including iron; cost of land, buildings, and fixtures, including land damages; cost of cars, horses, harness, and motors and other machinery; total cost of road and equipment; length of road in miles; length of double track, including sidings; weight of rail by the yard; the number of cars and of horses; the number of motors; the total number of passengers carried in cars; the average time consumed by passenger cars in passing over the road; repairs of road-bed and railway, including iron, and repairs of buildings and fixtures; total cost of maintaining road and real estate; cost of general superintendence, salaries of officers, clerks, agents, and office expenses; wages paid conductors, drivers, engineers, and motor-men; water and other taxes; damages to persons and property, including medical attendance; rents, including use of other roads; total expense of operating road and repairs; receipts from passengers; receipts from all other sources, specifying what, in detail; total receipts from all sources during the year; payments for maintenances and repairs; payments for interest; payments for dividends on stock, amount and rate per centum; total payments during the year; the number of persons injured in life and limb; the cause of the injury, and whether passengers, employees, or other persons."

Unlike some reports to city and State officials, these reports are public property; and much, if not all, of the details are furnished in printed slips to all applicants by the clerk of the Senate and of the House. The law, however, might well go farther, and provide for public examination and

audit of the accounts of these quasi-public corporations, and better methods of exercising the control over capitalization above mentioned.

In the report to Congress for 1897, the Metropolitan Railroad Company gives figures which may be compared with those just given for New York and Liverpool. Its 22 miles of underground electric conduit have 13.7 cars per mile, and carried, in 1897, 16,861,107 passengers, or 766,414 per mile — a heavy traffic. With 83 lb. rails, it reports: "There has been expended, on account of construction, equipment, etc., for the new underground electric system to date, including Columbia extension, $2,326,454.06." This is $105,660 per mile. The capital in excess of this, or $1,273,546, must represent real estate and the junk-pile. The average fares are only 4.38 cents, and the operating expenses and taxes about 2.45 cents. The profit of apparently $348,553.49 is 15 per cent of the $2,326,454.06 above quoted, and 9.7 per cent of the capitalization.

The Washington street railways, like those of Massachusetts, enjoy no franchise. The acts creating and governing the roads contain the startling provision that they "may *at any time* be altered, amended, or repealed by the Congress of the United States."

Cincinnati.

The State of Ohio, in 1896, passed the so-called Rogers Law, permitting cities to give 50-year franchises. A prominent member of the Ohio Legislature learned of the proposed law some days in advance of the meeting of the Legislature, through a conversation of Mark Hanna which was overheard in a railroad train; but with all his efforts, he was not able to prevent the final passage of the bill. Before the people of the State secured the repeal of the law, at the next session of the Legislature the city government of Cincinnati was induced to grant a 50-year franchise to the railways of that city.

Fares on most of the Cincinnati lines are five cents; but in 20 years, and every 15 years afterwards, fares, taxes, transfers, and all other terms and conditions, are declared in this franchise to be subject to revision by the city, after hearings,

"provided, however, that the terms so to be fixed shall be equitable according to the then cost of carrying passengers, and to be acceptable to and agreed upon by The Cincinnati Street Railway Company, its successors or assigns, or if said parties should not be able to agree upon said terms and conditions, then all questions with respect to the same shall be submitted to the adjudication of a court of competent jurisdiction in a suit brought by the said The Cincinnati Street Railway Company, its successors or assigns, to enjoin the municipal corporation from enforcing the terms so fixed."

What shall guide the court in determining "equitable" terms "according to the then cost of carrying passengers," the law unfortunately does not determine.

Chicago.

Says Mr. Porter, in the Massachusetts Special Street Railway Report (p. 207) : —

"If those who have filled our library shelves with dissertations on municipal matters had expended one-half the energy in studying from a broad and practical standpoint the development of the up-to-date street-railway system of Chicago, with a total mileage actually exceeding that of the United Kingdom, which they have devoted to the 'common-good-fund' experiment of three years in horse-cars and 77 miles of track in the city of Glasgow, they might perhaps have discovered some useful testimony."

Although the writer devoted a considerable portion of a year to such a study of the Chicago street railways, for the 1896 Report of the Illinois Bureau of Labor Statistics, it was scarcely possible to find a single lesson in the relations of the city to the railways which Chicago could teach the rest of the world, save that 20-year franchises have been proven long enough to permit of all the enormous development of track and service which Mr. Porter lauds. But more corrupt relations between the city and State governments on the one

hand, and public franchises on the other, it would be difficult to find. A prominent street-railway financier tells the writer that he offered to build extensive lines in Chicago about five years ago, before quite all the streets had been secured by existing companies. He offered a straight 3-cent fare, and a considerable bonus to the city. But members of the City Council assured him that such terms were not important. The vital condition was that he must pay $50,000 to the aldermen at the start, and $250,000 when he secured his franchise.

President Farson, of the Calumet Street Railway of South Chicago, publicly stated early in 1896, when a franchise with little compensation and 5-cent fares was about to be granted to the General Electric Railway, from the heart of the city south to 26th Street, that for such a franchise for 20 years, if he could have it without dishonorable relations with the City Council, he would pay $100,000 to the city, and give a straight 3-cent fare. It is the almost unanimous belief in Chicago that the existing street-railway companies have promoted this terrible condition of affairs on which they have fattened, and that so far from attempting to secure reform, have spent enormous sums of money in securing the passage by the Illinois Legislature in 1897 of the so-called Allen Law, modeled after the Rogers Law of Ohio. The

great fear of Chicago is that a corrupt council will fasten fifty-year franchises upon the people before the new law can be repealed, as it is pretty sure to be ere long.

The Massachusetts Special Street Railway Committee again illustrated its bias — to put it mildly — by the following statement in its account of Chicago conditions: —

"The only demand for a lower rate of fare comes from the Socialists, who oppose any payment being made to the city, and advocate the reduction of gross income by lowering fares instead of by means of such payment. The service appears in general to be satisfactory, excepting some complaint that not sufficient cars are run, this being a natural consequence of a tax on cars."

To those familiar with the demand for transfers between the north, west, and south sides of the city, and with the growing demand in many quarters that the Detroit and Toronto rates of fare or even less should prevail, this statement in the Massachusetts Report seems a little singular.

The respect for law on the part of some railway corporations in the Windy City is well illustrated in the following affidavit of a Chicago bridge foreman and inspector of bridges, quoted from the Bench by Justice Waterman of the Appellate Court of Illinois in rendering a decision.[1]

[1] Chicago General Railway Company *et al. vs.* The Chicago City Railway Company, October Term, 1895, p. 521.

The affiant states: —

"That about 10 o'clock on the morning of April 4, 1895, he was working in the neighborhood of said 22d Street bridge, and was attracted thereto by a great noise and riot in the streets; that he immediately hastened to the east end of the bridge, and there saw a car of the General Railway Company lying upon its side, with ropes and grappling-hooks attached thereto, which were also attached to a wrecking wagon of the City Railway Company; and affiant saw an immense crowd of men surrounding said car, armed with sledge hammers, axes, crowbars, pickaxes, and other instruments of destruction, and engaged in smashing up and completely destroying the car, which they continued until it was completely destroyed; that they were under the command of a large man, and acting under his orders in the work of destroying the car, and worked with great energy and rapidity, so that the entire destruction of the car was accomplished in less than ten minutes after the affiant reached the spot.

"Affiant saw L. E. McGann, president of the General Company, standing by and surrounded by a large number of citizens, who expressed great indignation at the acts of violence and destruction, and offered to interfere in behalf of the General Company, and drive the force of men who were destroying its car away, and throw them into the river, and teach them not to take the law into their own hands; but said McGann most strenuously exercised himself to repress the citizens who witnessed the said acts of destruction from interfering to stop the same; he used the most strenuous efforts to keep the peace, and but for his efforts to keep the peace, the destructive acts of the men who were destroying the car must have resulted in bloodshed."

Appellee alleges in his answer, says Justice Waterman,

"that it has the lawful right to keep possession of the tracks and prevent the use thereof by complainants, by the use of such force as may be necessary to accomplish that end."

Detroit.

The two chief lessons from this city are the impossibility of settling the street-railway question by competition, and the possibility of low fares. Although the Detroit Electric Railway was given a franchise in December, 1894, and gave promises and pledges to sell 8 tickets for 25 cents between 5.45 A.M. and 8 P.M., or 6 tickets for 25 cents at other hours, with rights of transfer, the company is now practically consolidated with the older line, known as the Detroit Citizens' Railway. The two roads have different letter-heads, but the same officers, the same power-house, and the same color of cars, — one car being distinguished from another by the description of the route taken, as given on the outside of the car. Since this virtual consolidation, the low fares are still maintained on the newer road, as the ordinance requires.

There was so much complaint of a reduction in the frequency of the service on this line, in order, as it was believed, to force people to pay the higher fares of the other company, that a city ordinance was passed, Feb. 2, 1897, specifying how often the cars must run, and what routes they must take.

The receipts of the new road, however, because of its location on the newer and more sparsely settled streets, or because of the desire of the new management, fell from $420,915.53 April 1, 1896–7, to $406,247.69 April 1, 1898–9.

This Detroit Electric Railway, when under its original management, from July 1, 1895, to June 30, 1896, operated 101 cars on its 56.2 miles of track, and carried about 10,659,000 passengers, or 189,608 per mile. This is about the average of the Lynn and Boston, or the Springfield (Mass.) road. But in order to secure this traffic, the Detroit road was obliged to have a car mileage of 58,704 per mile of track, or 30 per cent more than on these two Massachusetts roads. The gross receipts were only $6,439 per mile of track, or only 11 cents per car-mile, or 3.4 cents per passenger. The operating expenses were $4,188 per mile of track, 7.15 cents per car-mile, and 2.2 cents per passenger. The taxes were so low as to leave for profit and depreciation about $2,100 per mile of track, or about 5 per cent on the cost of the road. This was not enough. If the traffic had been two or three times as great per mile, as in our larger cities, an average fare of 3.4 cents would probably have furnished a good profit, a safe margin for depreciation, and have left for the city such franchise taxes and paving expenses as are usually paid by American street railways. It is claimed that

this company did not pay the usual taxes and street-paving expenses. As to taxes, it escaped the 2 per cent tax on gross earnings paid by the other company, but not the regular property tax. As to street-paving, the company removes the snow and ice, and restores the paving which it disturbs for its track; but the city ordinarily keeps the pavement in repair, and not only does all the new paving of streets where such is required, but laid six inches of concrete foundation for the ties of the new company.

More with reference, probably, to the future growth of the city than to immediate earnings, this Detroit railway, on Oct. 1, 1895, offered to sell single tickets for 3 cents and 40 tickets for $1, and pay to the city 3½ per cent interest on the purchase price of the better-located tracks of the "Citizens' Railway," and 3½ per cent of the net cost of their renewal where needed, if the city would buy these tracks at the expiration of the franchise of the old company, and lease them to the new company; but the city was not in condition to accept the offer.

The Detroit Citizens' Railway, with its 122 miles of heavy rails, its 575 cars, and its excellent service, has for over a year been furnishing advantages to the city which the present mayor, Mr. William C. Maybury, considers equal to those furnished by the other company. They are at

least better than are furnished anywhere else in the United States. This old line sells six tickets for 25 cents, day and night, with universal transfers, and eight tickets for 25 cents between 5.30 and 7 A.M, and between 5 and 6 P.M.

The company has the great disadvantage of having issued $10,675,000 of securities, or about $87,500 per mile. It has an advantage in the great speed its cars are enabled to make in the broad, level streets of the city, 120 miles being a common day's work for a car. The company is under the disadvantage usually to be found in a level city no larger than Detroit (about 250,000), and with such excellent paved streets, viz., the extensive use of the bicycle. This company also does the usual amount of paving.

Under all these circumstances, the company has reduced the percentage of its operating expenses to its receipts from 84.8 in 1894 to 52.6 per cent in 1898–9, and in that year had gross passenger receipts of $11,525 per mile, and net earnings from operation of $6,034 per mile. The average taxes per mile were $284. The net earnings, of about $6,100 per mile, were 5.6 per cent on the outstanding securities.

These net earnings are over 10 per cent on what the company concedes to be the cost of duplication, while it claims, with great show of reason, that the road was so fully kept up and even improved

out of current earnings, that there is practically no depreciation. This indicates that a company under such conditions as exist in Detroit, which are neither the best nor the worst among our large American cities, can make a good profit by selling 6 tickets for 25 cents all the time, and 8 for 25 cents at certain hours of the day most important for workingmen. The average fare on the Detroit City Railway is not far from 4¼ cents, no allowance being made for transfers, which would still further reduce it.

In the spring of 1899 the structural value of the Detroit street railways was found to be $8,000,000, and their franchise value, $8,478,563.86, although the average life of the franchises was only about 16 years and 9 months.

Montreal.

The only company in Montreal (population about 250,000) is the Montreal Street Railway Company, chartered in 1861, and with its franchise in 1892 extended for 30 years. As in Detroit, the fares are low; for while single tickets are 5 cents, and between midnight and 6 A. M. the company can charge 10 cents, it must, during the rest of the day, sell 6 tickets for 25 cents and 25 for $1, and provide tickets for school children at the rate of 10 tickets for 25 cents, and workingmen's

tickets, available between 6 and 8 A.M. and 5 and 7 in the evening, eight tickets for 25 cents. These hours for the cheap tickets are longer than in the case of the Detroit Citizens' Railway. The latter does not give a special rate for school children's tickets. Quite significantly the Massachusetts Report omits all reference to these low fares.

The company gives free transfers, pays the city the cost of paving between the rails, and $1,650 per mile of street, or a sum of a little over $52,000 a year, for clearing off snow. This road, of over 84.5 miles of track and 5.3 cars per mile, did a business, Sept. 30, 1896–1897, of $1,342,368,. or $15,886 per mile. Assuming that the average receipts from fares are about 4.26 cents per passenger, as in Toronto, which has similar rates of fare, this would mean 372,910 passengers per mile of track. The company, after paying a franchise tax of about $60,000 in addition to the usual city tax on real property, and after paying 4½ per cent and 5 per cent interest on its $1,000,000 of bonds, paid 9 per cent dividends on $4,400,000 of stock in 1896–1897, and placed in the surplus fund 3.2 per cent more.

The operating expenses and ordinary taxes, exclusive of the franchise tax, have gradually fallen from 82.68 per cent of the gross receipts in 1891–1892 under horse traction, to 54.87 per cent in 1896–1897 under electric traction. The franchise

tax is 4 per cent of the gross earnings up to $1,000,000; 6 per cent of the gross earnings between $1,000,000 and $1,500,000; 8 per cent on the next half million of gross earnings; 10 per cent on the next half million; 12 per cent on the next half million, i.e., from $2,500,000 to $3,000,000; and 15 per cent on all gross earnings above $3,000,000. If the company had been content with 7 per cent dividends, but with the same addition to surplus which was probably virtually a depreciation fund, fares could have been reduced to 4 cents. If, in addition to that, the city had exacted no franchise tax, fares could have been 3.8 cents. In virtue of the increase of traffic which would have followed such a reduction of fares, it might have been possible to maintain 7 per cent dividends with 3.5 cent fare.

Toronto.

The experience of this city of about 200,000 inhabitants, with low fares and high franchise taxes, is too familiar to require lengthy treatment, but the leading facts may be here briefly reviewed.

In 1891 the franchise of the single street railway expired; and the city operated the line for a few months, having paid the appraised value of the physical plant, $24,640 a mile. Although city operation was very successful, and more prof-

itable than the lease since made, the City Council of 24 members decided, by a majority of one, to grant a franchise for 20 years, with the privilege of renewal for 10 years more on condition that the successful bidder should sell 8 tickets for 25 cents for use before 8 A.M. and between 5 and 6 P.M., and 10 tickets for 25 cents for use of school children between 8 A.M. and 5 P.M. during the five school days of the week; 6 tickets for 25 cents and 25 for $1, good at other times except late at night, when the company is at liberty to charge 10 cents. Single tickets were to be 5 cents, and free transfers were to be given. Cars were not to be crowded, the city engineer being the judge. No Sunday cars were to be run until agreed upon by a vote of the citizens. Since May, 1897, Sunday cars are run, with 7 tickets for 25 cents all day. No employee was to work more than 10 hours a day, or 60 hours a week, or more than six days per week, or for less than 15 cents per hour.

In return for city construction and maintenance of all paving, the company was to pay the city annually $800 per mile of single track, and was to remove snow and ice. The whole system was to be transformed from horse-car to electricity, and the tracks were to be extended from time to time, as recommended by the city engineer and approved by two-thirds vote of the City Council, subject to the right of the city to grant a franchise to another

company on streets which the original company should refuse to occupy.

Finally, the company was to pay the city for the physical plant what the city had just paid for it; and at the end of the contract the city was to have the right to "take over all the real and personal property necessary to be used in connection with the working of the said railways, at a value to be determined by one or more arbitrators. . . . But the city shall only pay for the land conveyed by them [the railways] to the purchaser [the city] what it is worth, without reference to its value for the purpose of operating a street railway or railways."

Subject to these conditions, bids were solicited. "Capitalists from New York, who came to investigate the offer, laughed at the thought that they should pay any of the earnings to the city. They had been accustomed, so they informed one of the committee, to pay something to the aldermen, but nothing to the municipality."[1] Three bidders, however, finally appeared, and the successful company agreed to pay 8 per cent on all gross receipts up to $1,000,000 per annum; 10 per cent on receipts between $1,000,000 and $1,500,000; 12 per cent between $1,500,000 and $2,000,000; 15 per cent between $2,000,000 and $3,000,000;

[1] The New York *Outlook* of Feb. 5, 1898, article by W. D. Gregory.

and 20 per cent on all gross receipts over $3,000,000. This would mean an average of from 17 per cent to 18 per cent of the total gross receipts of the Boston, New York, and Philadelphia companies, and from 10 to 14 per cent in Chicago, Brooklyn, Jersey City, Pittsburg, Minneapolis, and St. Paul, and would mean as much in several other cities if the lines were united.

Since 1891 the successful bidder has extended the system from about 68 miles to 90.93 miles, and by substituting electricity for horse-power has reduced operating expenses and the ordinary taxes from 71.9 per cent of the gross receipts in 1892 to 48.8 per cent in 1897. As the average amount paid per passenger in the latter year was 4.26 cents, the cost per passenger, aside from the franchise tax, was 2.08 cents. The number of passengers carried per mile was 277,921, and for each mile of track the company had 2.8 electric motor cars and two trailers. After paying interest on $32,992 of bonds per mile, or enough, probably, to duplicate the road, the company, in 1897, paid in dividends about 3.3 per cent on stock issues of $65,984 per mile, and laid aside a surplus of about 1.2 per cent. If the stock issues had been limited even to $17,000 a mile, bringing up the total capitalization to $50,000, the dividends and surplus on this stock would have been 11 per cent. The franchise tax of about $87,761 [1] was equiva-

[1] Aside from the paving tax of $800 a mile, which yields nearly $73,000, or $0.0029 per passenger.

lent to $0.0035 per passenger. If, therefore, any such tax had not been required, the average fare might have been 3.9 cents and still have left as large a profit, even if there had not been any increase of traffic with the reduced fare.[1] In explanation both of the large over-capitalization and of why the city consented to forego direct city operation after its great success in the same during a portion of 1891, one of the counsel of the road informed Dr. Charles B. Spahr, of *The Outlook*, that two of the original four who received the franchise had sold out after doubling their money, and the owners of the franchise were entitled to compensation for the vast amount of credit they had to command in order to take the franchise, and also for their "labor in agitating against municipal ownership"!

The gross earnings of the company per car-mile in August, 1896, were 15.71 cents, and the operating expenses 7.61 cents.

In fairness it should be added, (1) That the company had to pay, in 1891, for the 68 miles of horse-car lines, $1,453,788, or $21,377 per mile. Reckoned on the present 91 miles, it would be $15,975 per mile. Most of this, however, should have been written off ere this as depreciation. (2) Some American companies in cities of the same size as Toronto might be slightly handicapped by the necessity of more mileage for so large a city

[1] The omission of the paving tax would have rendered possible a further reduction of fare to 3.6 cents.

even with the same traffic, and by the fact that wages are probably higher in the United States than in Toronto.

Massachusetts.

This State has been so much more progressive than any other in this country in the attempt to regulate without owning public utilities such as electric light, gas, street and steam railways, that much can be learned from a close study of its experience.

In 1853 the first street railway in the State was chartered, — the Metropolitan of Boston, and a Cambridge Company. In 1860 there were 88.87 miles of horse railway in the State; in 1870, 139.44 miles; in 1880, 222.54 miles; in 1890, 612.38 miles; and in 1897, 1,516.64 miles. No cable or steam dummy lines have ever existed in the State. In July, 1888, the first electric cars were used on the Lynn and Boston railway, and in February, 1889, on the West End system, then just organized in Boston, although the first road to be fully equipped with electricity was the Boston and Revere, in August, 1889.

In September, 1897, there were only 11.95 miles of horse-car line left in the State. Prior to 1864 charters were granted with 50-year limits, and with the right of city purchase at the end of the time.

These features were omitted in the codification of the law of 1871. Although this code was supposed to provide a general law for the chartering of the railroads, special charters have still been sought and secured. In most cases, however, these charters have not exempted the companies from the general provisions now to be considered. A railroad commission was created with salaries, which are paid as in the case of the gas and electric light commission, by the company supervised; and this is considered by a former member of one of these commissions to be unwise, since it unconsciously tends to make these boards feel beholden to the companies from which they derive their income.

The steam railroad and street railway commission, which is one body, must directly, or through an accountant, examine and supervise the books and accounts of all railroad and railway corporations, "to see that they are kept in a uniform manner upon the system prescribed by the Board." On complaint of 20 legal voters of a place, or of the mayor and aldermen or town selectmen, the board may investigate the reasonableness of fares, and order reductions, but not below "the average rates of fare charged for similar service by other street-railway companies, which in the judgment of the board of railroad commissioners are operated under substantially similar conditions."

This limitation will doubtless prevent any reductions below five cents, as the railroad lobby must have realized. Prior to 1897 the law prevented any reduction of fares that would lower the net profits below 10 per cent upon the cost of construction, which was often the high cost of previous years.

In all the reports of the Board, there are only two or three cases of any recommendation by the Board for the reduction of fares, and in no case did this recommendation call for a lower fare than 5 cents.

Since 1871 no certificate of stock in any street-railway company could be issued until the par value was actually paid in cash. No stock could be issued in payment for property, but only for cash. No increase of stock beyond the amount fixed and limited by its articles of association or by an Act of the Legislature could be made without the approval of the Board. As slightly amended in 1887, this increase is carefully limited to extensions of road or to

"other necessary and lawful purposes set forth in the petition; and the Board, after an examination of the assets and liabilities of the company, and a hearing on the petition, if it appears that the proposed purpose is lawful and consistent with the public interest, and that increase of capital is necessary in order to enable the company to carry out the same in good faith, may by an order in writing

allow such necessary increase, specifying the amount thereof, and the purpose for which the same is allowed; but no increase shall be allowed beyond the value of the property of the company, including the cash to be paid in on such increase. A certificate, showing the amount and purposes of the increase so allowed, shall forthwith be filed in the office of the secretary of the Commonwealth."

In 1896 the provision that no increase of stock could be made in excess of the structural value of the plant and of the cash assets was repealed, and instead it was provided, "If it appears that the assets or capital stock of a company are impaired, the Board may prescribe such conditions and requirements as it may deem proper," and make a full statement of the case in its annual report.

The two subsequent reports of the Board refer to only two cases where actual impairment of the stock has been brought to the notice of the Board through an application to issue more securities. In one case, that of the Lowell and Suburban, where the 58 miles of road, with about two cars and four motors per mile, had an outstanding net capitalization of $36,607.15 per mile, the Board found that about $4,018.93 of its $13,797.38 of stock per mile represented no existing structural value. The Board, however, permitted a considerable increase of capitalization for improvements, and merely ordered that the dividends should not exceed 6 per cent until the impairment was re-

placed. Even this limit was raised to 7 per cent in 1897. The other case, that of the West End, will be referred to later.

In May, 1889, the Legislature introduced restrictions upon the issue of mortgage bonds by limiting the purpose of their issue to construction and equipment, the purchase of necessary real or personal estate, the refunding of its funded debt, and extensions,

"provided that the Board of Railroad Commissioners, after an examination of the assets and liabilities of the company, and such further investigations as it deems requisite, shall by vote approve of such issue as being consistent with the public interests. The vote of approval shall specify the amount of the issue, the rate of interest, which in any case shall not exceed six per centum per annum, and the purpose to which the proceeds shall be applied; and no such issue shall be authorized unless, in the opinion of such Board, the value of the constructed tracks, the equipments, and the other real and personal property of the company, taken at a fair value for railroad purposes, and excluding the value of the franchise, equals or exceeds the amount of the capital stock outstanding and the debt. A certificate, setting forth the vote of approval, shall be filed in the office of the secretary of the Commonwealth before such bonds are issued."

Clever attorneys found means of evading the purpose of the law by issuing coupon notes and other evidence of indebtedness not secured by a mortgage. Therefore, in 1897, a law was passed

forbidding the issue of such paper payable more than twelve months from the date thereof, and further forbidding the issue of such long-time notes "to an amount which, including the amount of all such securities previously issued and outstanding, exceeds on the whole the amount of its capital stock at the time actually paid in."

Until 1893 issues of stock could be taken at par by stockholders, no matter how much of a premium they might command. The law forbidding this, as amended in 1894, requires stockholders to pay the market value of all the new issues of stock which are not sold in the open market. The Board fixes this market value, "taking into account previous sales of stock of the corporations and other pertinent conditions."

The Gas and Electric Light Commissioners were at the same time empowered to act in the same manner in the case of gas and electric light companies, and the "commissioner of corporations in the case of an aqueduct or water company, or a corporation established for and engaged in the business of transmitting intelligence by electricity."

Since June, 1894, an existing abuse was stopped by the following law: —

"If a foreign corporation which owns or controls a majority of the capital stock of a domestic street railway, gas, or electric light corporation, shall hereafter issue stock, bonds, or other evidences of indebtedness based upon or secured

by the property, franchise, or stock of such domestic corporation, unless such issue is authorized by the law of this Commonwealth, the supreme judicial court sitting in equity may, in its discretion, dissolve such corporation."

In May, 1894, all stock or script dividends were forbidden in the case of telegraphs, telephones, gas and electric light, steam and street railways, aqueduct and water companies; and it was provided that no lease, purchase, or consolidation of street railways should be valid until approved by the Board. In 1897 it was further ordered that the capitalization should not be increased as a result of consolidation. The Board has had control since 1896 of the location of interurban roads on State highways, and could alone authorize extensions beyond the limits of its charter into neighboring towns and cities. The Board may order additional accommodations for passengers, prescribe the fenders that must be upon all cars, and make rules for the heating of cars. A day's work for all conductors, drivers, and motormen cannot exceed 10 hours in 12 except in cases of special emergency.

Before considering the tenure of Massachusetts companies and the great change therein effected in 1897, it is well to consider the effect of the admirable laws just described. Unfortunately they were not all passed before the introduction of electricity. Through various loopholes in the

earlier laws, such as the issue of coupon notes, the issue of valuable stock at par to stockholders, and a large increase of securities on the consolidation of companies, stock-watering was by no means unknown even in Massachusetts. Indeed, where the general railway law threw great restrictions around such increase of securities, the Legislature was sometimes induced to grant special exemptions. For example, the report of the Massachusetts Railroad Commission of January, 1894, states that between Sept. 30, 1892, and Sept. 30, 1893, seven companies were thus consolidated into two, the Lynn and Boston, and the Lowell, Lawrence, and Haverhill, with an increase of capitalization from $3,857,140 to $8,580,077 — an increase of $4,722,937, or about 125 per cent. In other words, the increase per mile was from $27,011 to $53,649. The only apparent result to show for this was the transformation of 46.6 miles, or less than one-third of the road, to electric traction, and the building of 17.3 miles of new track.

The Board more than once in its reports refers to the amount of water infused into the capitalization of consolidated companies.[1] The Board has declared that a part of the increase of $12,477 of capitalization per mile in all the Massachusetts companies in 1892 and 1893 was "stock-watering pure and simple;" and the Board has also held

[1] Report for 1894, p. 105, and for 1895, p. 99.

that many companies were not charging off for depreciation as much as the great decline in the value of electrical appliances demanded; yet there do not seem to be more than one or two cases where the Board has taken any action on account of it, either in refusing to permit increase of stock and bonds, or in requiring reduction of dividends.

One company, with more than half the income of all the 93 railways of the State, although possessing only a little over one-sixth of the mileage, — the West End Company of Boston, — has been particularly aided by special laws. The Metropolitan Railway of Boston, in September, 1887, had 90 miles of horse railway in the heart of Boston, and carried 472,850 passengers per mile, with a capital investment per mile of only $38,903. From its situation and the density of its traffic it had doubtless cost as much per mile as any other of the large roads of the city. When it was consolidated with the others, however, to form the West End system, the capitalization of the latter in 1889 became $62,954 per mile, for its 217 miles of road. Yet the average density of its traffic (480,000 per mile) was scarcely greater than that of the Metropolitan, and only 12.9 per cent of its track had become electric. There was thus an increase of 50 per cent per mile in capitalization over that of its most important constituent.

In 1887 the West End Company was exempted from what continued for 10 years to be the danger confronting all the other companies of the State in case they greatly offended public sentiment; viz., the right of the city government to revoke all locations in the streets. This right with regard to the West End Company was made subject in 1887 to the Board of Railway Commissioners, as it was in 1897 in the case of all other railways of the State. In 1897 the West End Company was allowed to lease its road to a new elevated company; and this company was guaranteed a 5-cent fare for 25 years unless its "net divisible income after paying all expenses of operation, interest, taxes, rentals, and other lawful charges, and after charging off a reasonable amount for depreciation," should yield more than eight per cent per annum on its stock. Further, for this 25 years "no taxes or excises not at present in fact imposed on street railways shall be imposed in respect of the lines owned, leased, or operated," by this corporation other than those at the same time imposed by general law on all street-railway companies. In return for all these and other favors, the Elevated Company is to pay an annual tax of seven-eighths of one per cent of the gross earnings of all its owned or leased lines; and if its annual dividends exceed 6 per cent, it is to pay an additional sum equal to the excess of the dividend above this

6 per cent. In June, 1898, when a few additional taxes were imposed upon street railways in return for many privileges, such as were already enjoyed by the West End Company, it was especially provided that these extra taxes should not be paid by the latter company.

The net result of Massachusetts street-railway regulation has been seen not in the reduction of fares, but in the increasing restrictions upon capitalization, which has fallen from $52,963 per mile in Sept. 30, 1894, to $44,683 Sept. 30, 1897, when there were 1,414 miles of track. Part of this fall, however, was due to the building of some new lines where traffic was expected to be light, and the construction was therefore cheap. Prices of material had also greatly fallen. The average capitalization on the 4,584 miles of road in the central States — Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, and Kentucky — was over twice as great, or $91,500, although the number of cars per mile, according to *The Street Railway Journal* for August, 1898, was 3.78, which was exactly the same as in Massachusetts. The figures for capitalization are taken from the October, 1897, edition of the same journal.

According to the same authority, the 4,495 miles of track in New Jersey, New York, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, and the District of Columbia, had $138,600 of capital-

ization per mile of track, or three times that in Massachusetts, although the number of cars per mile was only 4.56, or 23 per cent more than in Massachusetts.

Even the Massachusetts capitalization would be nearer $35,000 than $45,000 per mile if capitalized as strictly in accordance with the cost of duplication as is the admirable road in Springfield, Mass., whose 60 miles of track, with three cars and a traffic of 180,864 passengers per mile, is capitalized for only $30,829.08 per mile, and can be duplicated, according to the report of the expert of the Massachusetts Board, for about $31,500.

The Massachusetts Board, in its report of January, 1898, states that it "caused" an investigation to be made in 1897 of the tangible assets of the West End Company, and found they could be duplicated for $25,606,807.87, or $99,480 per mile, or about 2 per cent less than its net indebtedness and stock issues. This road carries 647,083 passengers per mile, and cost more to construct because of local conditions than most other roads in the country; yet there are four reasons for believing that the road could be duplicated for less than $70,000 per mile.

1. The opinion to that effect expressed to the writer by officers of the State Board.

2. The refusal of the Board and of the West End Company, and all others concerned, to permit examination of this appraisal, although many other appraisals were previously shown by the Board.

3. Mr. E. E. Higgins, an excellent authority on the subject, gave an itemized statement in *The Street Railway*

Journal for March, 1896, of how a thoroughly modern plant, with only the real estate actually needed for the business, and with 275 miles of track, could be built in Boston for $17,237,000, or $62,680 a mile. A proper allowance for paving would increase this amount to about $70,000.

4. A comparison with the known costs of many other large plants, both in and outside of Massachusetts, confirms this estimate.

FARES AND PROFITS IN MASSACHUSETTS.

The West End Company, after paying 5 per cent interest on its $40,000 per mile of bonds, has averaged 6.84 per cent on its $60,000 of stock. Had this stock not been issued in excess of structural values during the consolidation of horse-car lines in the eighties, the ratio of dividends to the value of the physical plant would have been proportionately larger. The average dividend on the total preferred and common stock in 1897 was 7.69 per cent.

The crooked and congested character of Boston streets has prevented much increase of speed, and therefore of profit, under electric traction as compared with horse-car service. The public has of course derived great benefit from the suburban service, and from the increased length of ride possible for a nickel. The average length of ride has doubtless also increased. The company has reaped its benefits in part through finding investment at

a better return in large extensions than it could do in a competitive business at equally small risks. A considerable proportion of the earnings of the last five years also have apparently been devoted, very wisely, to bringing up the value of the physical property nearer to the par value of the securities than hitherto. As for the rest of the State, the recent street-railway committee holds that the roads have not earned fair returns on their investment. The committee says, "Of the 76 remaining acting companies, 34 paid no dividends in 1897, while 42 paid dividends of from 1.25 per cent to 10.5 per cent, averaging 4.29 per cent." This is a curious under-statement, since in 1897, according to the report of January, 1898, of the Board of Railroad Commissioners, only 28 companies paid no dividends. These companies operated only one-seventh of the mileage, and carried one-twentieth of the traffic of the State. Their average length of track was only 7.5 miles, and their average number of passengers per mile only 70,895, yielding about $3,350 of gross receipts. The 48 other companies, aside from the West End, averaged 5.68 per cent dividends on the nominal capital stock, and probably over 7 per cent on the structural value of the plants; yet these companies, with an average capitalization of $33,785 per mile, carried only 135,616 passengers per mile, yielding about $6,800 of gross receipts per mile. Condi-

tions thus far, however, in all the street railways of the State, have been very exceptional, because of the unusual depreciation incident to the introduction of electrical appliances — a depreciation which the State has to some extent forced the companies to make up before declaring large dividends. Another handicap upon the street-railway companies everywhere has been the feverish extension to new territories of constantly diminishing returns. As this ratio of expansion for the older companies is not likely to continue, lower fares in the larger Massachusetts cities should soon be practicable.

RECENT CORPORATION ENCROACHMENTS.

Thus far the strength of the Commission idea, when fairly sustained by law, has been demonstrated. Its weakness is also beginning to appear. With growing financial strength, the Massachusetts street railways are securing enough influence over the Legislature to cripple the Commission, and secure exemption from an unpleasant amount of municipal control.

The recommendations of the Massachusetts Special Street Railway Committee were twofold: First, the ownership of the track or road-bed by cities with operation by private companies; and second, greater security to the companies against

efforts of city governments to secure low rates of fare and other concessions. As might be expected in this stage of development, the Legislature ignored that portion of the report looking toward ownership of the road-bed, and gave the private companies all of the many favors suggested by the committee.

Hitherto city governments have held a great club over street railways in the right to order removal of the tracks. This right can now only be exercised subject to the approval of the Railroad Commission, of which a writer in *The Street Railway Journal* for September, 1898, thus speaks: "Its wise decisions have probably done more to establish electric railroading in Massachusetts on a sound and profitable basis than any other single influence." To those who believe that a somewhat less "profitable basis" might be beneficial to the public, this change in the Massachusetts law would hardly appear an improvement. The law might well have provided that in case a city went so far as to order the removal of tracks from one or all of its streets without giving another equally good location, it should pay to the company the structural value of the plant so far as injured or rendered useless by the order for removal. Again, when companies request an extension of tracks, cities can no longer, as hitherto, take advantage of this opportunity to secure such

farther concessions as the street railway may consider the extensions to be worth. The railroads are also relieved from giving tickets or passes to public officials, except policemen, firemen, and letter-carriers in uniform; indeed, the railways are forbidden to extend these privileges to public officials. They are also relieved from keeping the street between their tracks in repair, unless the burden is imposed in original grants. In return for these radical departures, two very moderate forms of taxation are imposed: First, a tax equal to all dividends above 8 per cent, but only in case the dividends have averaged 6 per cent since the company began to operate its road. Second, a one per cent tax on gross receipts if they do not exceed $4,000 per mile of single track, 2 per cent of the receipts when between $4,000 and $7,000, 2¼ per cent when between $7,000 and $14,000, 2½ per cent when between $14,000 and $21,000, 2¾ per cent when between $21,000 and $28,000, and in all other cases 3 per cent. These taxes do not compare very well with the 9 per cent tax on gross receipts in Baltimore, or the low fares in Detroit and Toronto, equivalent to a 15 per cent tax of gross receipts. The Toronto Company not only collects an average fare of 15 per cent less than the common 5-cent fare of other American cities, but, as we have seen, pays as taxes over 8 per cent of its gross receipts, aside from

taxes on real estate. Thus the total public burdens of the Toronto railway in the way of low fares and taxes are equivalent to over one-fifth of its probable receipts on a 5-cent-fare basis. The entire taxes in Massachusetts in 1897 amounted to $592,454.18, or only 3.7 per cent of the gross receipts of $15,898.89, or about one per cent of the par value of the capital stock and funded debt. The taxes of the Boston railways were 4.27 per cent of their income, and 1.4 per cent of the stock and funded debt.

The West End Company has of late made still greater encroachments on the rights of the people. It has secured for 25 years a total exemption from any burden, duty, or obligation which is not at the same time imposed by law on all street-railway companies. The State cannot, for that length of time, order an underground conduit system, or any new safeguard or appliance for Boston's crowded streets, unless ready to order it for the far different conditions elsewhere. The powerful financial interests back of this company have also secured State approval for a lease guaranteeing for 25 years, "free of all taxes," 8 per cent on its preferred stock and 7 per cent on its common stock, which even the late appraisers, with all their conservatism, pronounced impaired 8 per cent. Seven per cent on stock representing in structural value only 92 per cent of its par value

is 7.63 per cent of its real value. Nevertheless, a 25-year lease in Boston is better than a 999-year lease in Philadelphia or New York, or even a 50-year lease in Cincinnati; and the Massachusetts Railroad Commission did have sufficient backbone to refuse assent to a 99-year lease, and a guaranty of 8 per cent on even the common stock.

With all its defects, the Massachusetts system of State regulation has succeeded to such an extent in keeping down capitalization to normal limits as to deserve the most careful study and imitation throughout the country. Although the writer believes in ultimate public ownership and operation of street railways, the movement in this direction would be rendered easier by such restrictions of capitalization as prevail in Massachusetts, to say nothing of the fair amount of publicity, with respect to other phases of the street-railway question that have been secured in that State. There would not thus be so many so-called "innocent investors" to protest against any action that would ignore the water in their stock. It is much easier, as Massachusetts has found, to prevent the injection of water, than to get it out when once in.

Berlin.

The best that the continent of Europe can teach in the matter of street railways is as to the character

of term franchises. The contract recently made between the city of Berlin and its street railways, as given in the Massachusetts Special Committee Report, is a very good example of these franchises for limited periods, and might well serve as a model for American cities that are not ready to adopt city ownership.

Berlin had 1,677,000 people in the city limits in 1895, and 2,255,000 within $9\frac{1}{4}$ miles from the center of the city. Its 260 miles of street railway carried, in 1896, 192,252,000 passengers. There were two principal lines operated by horse-cars, and a few other small ones partially electric. The franchises of all were recently extended to Dec. 31, 1919, under the following conditions, among others: —

1. The companies must unite, and convert the entire system into electric traction.

2. If, during the life of the contract, the city authorities require extensions within the city limits, which are not specified in the contract, the company must build as much as 93 miles, double track being counted as single. But the company should receive from the city one-third of the cost of construction of all lines ordered between Jan. 1, 1902, and Jan. 1, 1907; and one-half of the cost on all lines ordered between Jan. 1, 1908, and Jan. 1, 1914. For all lines ordered after that the city must pay the full costs of construction, or a

full allowance towards the cost of operation, as determined by later agreement.

3. The overhead trolley was to be employed at first, except where the city demanded storage batteries; but if any other motor system should later prove practicable, and in the judgment of the city authorities should appear more suitable, the company may introduce it; and if the city authorities request, the company must introduce it. If increased cost accrue to the company thereby, due allowance being made for benefits obtained from the new system, the city must indemnify the company.

4. The company must pay to the city 8 per cent of its gross receipts on streets in the city limits, and also one-half of the excess of its net divisible income above 12 per cent on its present capital, and 6 per cent on any additional capital.

5. The company must maintain its street paving, but cleaning and sprinkling are done by the city.

6. Suitable waiting-rooms at terminal and intermediate stations, warmed in winter, must be established at the request of the city authorities.

7. The cars are to be so built that the use of "running boards" by conductors outside of the cars shall not be necessary, and motor men are not to be employed more than ten hours a day, except on special occasions.

8. Three years after the signing of the contract the companies shall not charge more than 2½ cents within the city limits nor outside of them to the end of every line in 20 enumerated suburbs. Commutation and scholars' tickets must be issued on every line at reduced rates, and also at certain hours reduced rates must be given to workingmen.

9. At the end of the contract, all property of the road located in the city streets, including poles, wires, any waiting-rooms built on city property, and patents, come into the possession of the city without charge.

10. Provision is made for various courts of arbitration to settle disputes and disagreements between the parties to the contract.

11. Within six months after the date of the contract the company must establish a pension fund for all employees.

This careful guarding of the rights of both the company and the people, and the provision for the disposal of the property at the end of the contract, are worthy of all praise.

PUBLIC OWNERSHIP IN AMERICA.

The only two street railways owned and operated by public authorities in America are the two miles of single track of cable across the Brooklyn Bridge, and the small plant at Port Huron, Ontario.

The Brooklyn Bridge Railway has been famous since 1883 for its enormous traffic, efficient service, remarkable freedom from accident, and its admirable treatment of its employees. It has hauled over 500,000,000 passengers, with only two fatal injuries, one to a passenger, and one to a trainman, and one other serious injury to a passenger. The total amount of time lost on the railway by delays from all causes in 1896 was only 4 hours 48 minutes, an average of 40 seconds per day, and of one minute for each 152,765 passengers carried. The writer made a personal investigation of the treatment of employees in 1897, and found that the engineers received 50 cents per hour for 8 hours, or $4 a day, and the firemen 29⅝ cents an hour, or $2.37 a day; while the engineers on the privately owned elevated roads in New York and Brooklyn received $3 a day the first year, and $3.50 afterwards per day of 10 hours, and the firemen, for a similar 10-hour day, received $2 in New York and $1.75 in Brooklyn. The ordinary train-hands on the Bridge Railway received $2.86 for an 8-hour day, as contrasted with $1.50 to $2.30 for a 10-hour day on the elevated roads. The Bridge Railway employees also received free medical attendance in case of injury, and usually half their regular wages as long as needed, a two weeks' vacation on full pay, rubber coats and gloves, and two suits of uniforms a year. The employees of

the private owned roads said they had none of these advantages, but had to pay $9.80 for their summer suit, and $12.60 for their winter suit. The road has charged 3 cents for a single fare or 2 tickets for 5 cents, and has received an average fare of 2.73 cents. In 1897, the last year for which an official report is at hand, the total cost of transportation for the nearly 46,000,000 passengers in that year was apparently about $200,000 less than the receipts, if the expenses for interest and extensions, policemen, and some other charges connected with other parts of the bridge, be excluded. In fact, if a full separation could be made of the railway expenses from the other expenses of the bridge, it is quite likely that more than $200,000 of excess of receipts would be brought to light; but even the latter amount to be credited to depreciation and profit is 13⅓ per cent on the $1,500,000 which the chief engineer and superintendent of the road, Mr. Charles C. Martin, declares was the cost of the road itself, although the road and bridge together are said to have cost $15,000,000.

In order to accommodate the elevated roads of New York and Brooklyn, and permit of travel from any part of one road to any part of the other without changing cars, the Brooklyn Railway now permits the elevated railway trains to cross the bridge, although it thereby will lose a large portion of the traffic that has hitherto used its own cars.

Port Arthur, Ontario.

The only example of city ownership and operation of a street railway on the continent, aside from that over the Brooklyn Bridge, is that at Port Arthur, Ontario, a place of only 2,698 population in 1890. The road is of course too small to present many lessons or any evidence of financial success; but the following facts may be given.

The road is electric, with eight miles of track, two cars, and two trailers, with a maximum grade of two per cent, and an average grade of 1½ per cent. The cost of building and equipment of the system was about $112,500, or $14,063 per mile, for which 5 per cent bonds were issued. On an average, each passenger rides three miles, and pays 5 cents fare. The number of passengers was 158,573 in 1895, and 165,489 in 1897. This, of course, means that the total gross receipts were only about $8,274.45 in 1897, or $1,034.31 per mile, and the car-miles per mile of track were 8,500. Hence, the gross receipts must have been about 12.3 cents per car-mile. The operating expenses were probably large proportionately in so small a plant, but are not reported. The 28 smallest private companies in Massachusetts which had average gross receipts per mile in 1897 of $3,550 paid no dividends.

In June, 1897, the town installed an electric-light system of 1,000 incandescent lights of 16 candle-power, in connection with this railway.

BRITISH EXPERIENCE.

England is attracting world-wide attention in street-railway circles by its experiments in city operation of tramways. These experiments, however, are scarcely three years old outside of Huddersfield, Plymouth, Leeds, and Glasgow; and only one of these latter towns, Huddersfield, began municipal operation before 1893, although municipal ownership of the track has been common in England since 1870. In fact, the House of Commons, prior to 1896, had a standing order forbidding the introduction of any Act for such a purpose. Huddersfield and the two or three other towns that began public operation before 1896 were places where no private company could be found willing to undertake the work.

Many mistakes are made in America in arguing from British experience. The Massachusetts Special Street Railway Committee, for example, congratulates Massachusetts upon having as low a capitalization per mile as Great Britain, although electric traction such as prevails in Massachusetts is more expensive to construct than are horse railways such as prevail in Great Britain. But

this leaves out of consideration the fact, (1) that the street railways of Great Britain are confined to the very large cities where real estate and paving are most expensive, and (2) that the 788,569,669 passengers carried on the 1,507 miles of track in Great Britain in 1897 were the equivalent of 523,271 passengers per mile, while the 308,684,224 passengers carried on 1,517 miles of railway in Massachusetts the same year were equivalent to only 203,525 passengers per mile. Hence, the equipment necessary per mile of track was larger in Great Britain than in Massachusetts. Doubtless this density of traffic was one reason why, with average receipts per passenger in the United Kingdom in 1897 of only 2.61 cents, the operating expenses were kept down to 1.97 cents per passenger. Another reason for the lower fare abroad is the shorter distance traveled, and the fact that wages are only about one-half as much for the various classes of labor as in this country. The wages are one-half of the total operating expenses of the Glasgow railways. The difference in wages is equivalent to about two-thirds of a cent per passenger. It is quite likely that the disadvantages in most American street railways outside of our largest cities, the higher wages, and the longer haul, will not account for the fact that fares are nearly twice as high in America as in Europe; but it is evident that many of the students of muni-

cipal railways abroad have not made sufficient allowance for these factors. On the other hand, the opponents of municipal operation of such railways have made an unsound use of the fact that municipally managed railways in Europe are less developed in the matter of electric traction, extension to the suburbs, etc., than American private owned roads. All street railways throughout Europe under private ownership, as are most of them, are equally backward.

A conclusive proof of this is that with all lengths and characters of franchises in different countries and cities, there were, on Jan. 1, 1898, only 1,422.6 miles of electric street railways in all Europe,[1] or less than in the single State of Massachusetts, where franchises until 1898 have been subject to revocation any day at the discretion of the local government. Chicago, with only twenty-year franchises, had been favored prior to Jan. 1, 1898, with 872 miles of surface roads equipped for electric and cable traction. According to Mr. Porter, all Europe, with 400,000,000 inhabitants, has only 7,500 miles of tramways, or one mile to each 53,333 inhabitants, while America has 16,000 miles of street railway for its 72,000,000 of people, or a mile for every 4,500. America equally excels in the per capita distribution of sewing-machines and reapers. Such facts prove nothing as to the

[1] U. S. Consular Report, October, 1898.

relative merits of certain governmental policies on the two continents.

Again, the narrowness of the English city streets, the fear of endangering life, and other motives, have led the English Board of Trade to place such restrictions upon the speed of English tramways as to prevent much of the profit which comes from electric traction in America. The slow development of English street railways is also partly accounted for by the habit of the people from time immemorial to live over their places of business instead of in suburbs, so that street railways have not been as much needed nor as profitable as in the United States. A wide-awake American traveler can easily find that many enterprises in Europe, having no connection with public ownership or even with city franchises — for example, elevators, banks, hotels, and labor-saving machinery in excavating or building — are less used or developed than in America.

Huddersfield.

Huddersfield, from the beginning of the tramways in 1882, until 1897, was under orders from the Board of Trade to lease its street-railway lines as soon as a reasonable offer could be obtained from a private company. Hence it is not surprising if public ownership failed of financial success

where private ownership did not venture to enter. The claim of Mr. Robert P. Porter[1] that an American sydicate would probably have undertaken the work can be quickly dismissed; for the situation in this English city was widely advertised, and not unknown in America. Because of the steep grades, horse traction was impossible. Electric traction was not known in America until 1887, nor in England until much later. The steam-engine was used on the streets of Huddersfield. Up to April 1, 1896, the receipts seem to have covered all expenses of operation and depreciation except interest. During the last two years, ending April 1, 1888, tramways have paid interest also, and laid aside a small surplus. The hours of the employees were reduced to 8 in 1898, before the demand for an 8-hour day had become prominent, while the wages continue to be slightly higher than usual for that class of employment in England.

Plymouth, Blackpool, and Leeds.

In *Plymouth*, a city of 100,000 inhabitants, a private company, after partially constructing a short line of three and one-half miles, failed. No other company could be induced to continue the work; and the city was permitted, indeed forced, to undertake the business itself. It is not surprising,

[1] Massachusetts Special Report, Appendix E.

therefore, that it has only earned about two-thirds of the interest on the plant, after paying all other expenses. But traffic is now rapidly increasing; and the introduction of electricity, as in almost all the other city operated lines in Great Britain, promises great advantages, financial and otherwise.

Blackpool, with 40,000 population and 7 miles of track, was unable to secure a reasonable offer from a private company, and began operation of its tramways about fours years ago. In 1895–1896 and in 1896–1897 it earned a slight surplus above interest, sinking-fund, and taxes. It is not generally the aim of city undertakings to earn a large profit, but to give to the people the benefit of low charges, which in this case average 3.32 cents.

Leeds, with 400,000 population and 14 miles of track, already partly transformed into electric traction, obtained its tramways from a private company after the expiration of a lease by paying the structural value as the law permits. After paying interest, sinking-fund, and taxes, the city, in 1895–1896 and 1896–1897, had a surplus of from 2 to 2¾ per cent each year on the capital of $210,698. The city is now making new extensions and developing electric traction.

Glasgow.

This city, with a population of 703,920 in 1891, had always owned its track, and being unable to

obtain the terms desired from the old company at the expiration of the lease in 1894, decided to operate the lines itself. The General Tramways Act of 1870, as has already been stated, had allowed cities to construct tramways and lease them, but did not permit direct public operation except in the lack of any reasonable offer from a private corporation. The special Act, however, allowing Glasgow to construct its tramways, had passed Parliament in 1870, without any attention, apparently, having been paid to the clause authorizing the municipality to take over the lines at the expiration of a 20-year lease to a company with all that company's rights and powers. Among these "rights" was, of course, the right of operation. This paved the way for the most important experiment thus far in public operation, and one which is leading many English municipalities along the same line. Keir Hardie, the famous labor leader, informs the writer that the failure of a strike on the privately managed tramways of Glasgow did much to prepare the mass of the voters for the change of management. The city has been criticised for buying a new horse-car equipment in 1894, with new barns, etc., but no other course was within its reach. The private company would not turn over its own equipment, at least at any fair valuation, nor would it allow any transformation of its lines to electricity by the city until the

day that its own contract expired. The new buildings and cars of the city, however, were designed with reference to the needs of an electric road; and the city at once set about the investigation of the best form of electric traction, and in October, 1898, put in operation its first piece of overhead construction electric railway, using, as will most cities, the overhead trolley.

The 73 miles of single track, nearly all, however, built as double track, carried, May 31, 1897–1898, 106,344,437 passengers, or 1,456,773 per mile. A small portion of the road is leased from a private company. The 65 miles owned in 1898 had a capital charge of about $44,900 a mile.

It is claimed by Mr. Porter that the city was especially favored in undertaking city operation by the fact that the track obtained by the private company had been partly paid for by it. Yet there remained a debt of about $11,248 per mile, which could not have been much below the value of the partly worn-out horse-railway track.

Among the benefits obtained by the city from public ownership have been the following: 1. A change in hours of labor and the provision of uniforms by the city. This was considered by the old company as worth £13,085 a year, when they were asked by the city, as one condition of a new lease, to give similar favors to the men. A further gain to the employees has come since

September, 1896, in a raise of wages equivalent to £5,300 a year. These two items together, of about £18,000 a year, deserve to be considered in connection with the profits of the undertaking.

2. The service was improved. The city refused to imitate the example of the private company by defacing its cars with advertisements, and it had to meet the fierce competition of the 175 omnibuses of the old company. This it soon overcame, with its over 385 new cars.

3. The city has made large profits, and has every prospect of doing still better when electricity is substituted for horse traction, as it soon will be. The following table will show the growth of traffic and the net profit under city operation after deducting the rent of seven miles of track not owned until recently by Glasgow, and after the further important deductions of interest and taxes. Taxes have risen from £4,529 6*s.* 3*d.* in 1895–1896 to £11,486 11*s.* 9*d.* in 1897–1898. In the latter year they were about 2 per cent of the capital and 3 per cent of the gross receipts.

TRAFFIC AND PROFITS.

Date.	*Number Passengers.*	*Excess of Receipts above Operating Expenses, Taxes, and Interest.*		
July 1, 1894–May 31, 1895 (11 Mo.)	57,104,647	£24,204	14*s.*	2*d.*
June 1, 1895–May 31, 1896	86,462,594	70,610	15	6
June 1, 1896–May 31, 1897	98,966,658	68,315	13	10
June 1, 1897–May 31, 1898	106,344,437	82,149	7	1

If interest be added to the £82,149 7*s.* 1*d.* of profit in 1897–1898, the total amount available for depreciation and profit was £95,647 5*s.* 11*d.*, or about 16 per cent on the capital of £600,000. The city treasury is presented with £9,000 yearly, or about $1\frac{1}{2}$ per cent on the capital and $2\frac{1}{4}$ per cent on the gross receipts. The rest is applied to canceling the debt, improving the road, and to the accumulation of a reserve for extensions and the change to electric traction. A few miles of electric road were opened for traffic in October, 1898, as already stated, and several extensions to the suburbs are under way.

The largest amount received by the city from the private company as a license or franchise tax was £5,660 3*s.* in 1893–1894. The company also paid, according to Mr. R. P. Porter, $950,454.09 during the 23 years, or an average of £8,771 a year toward the original cost of the road. This £14,431 of yearly receipts from the company for these two purposes during the last and best part of its lease may be compared with the net public receipts of £70,000 to £82,000 a year since May, 1895, or more safely with the perhaps £40,000 a year left after full allowance for depreciation.

4. The fares have been reduced about 30 per cent. This is computed from a statement in the official report for 1896–1897, that if the old rates of fare had continued, the 99,000,000 tramway

passengers would have been charged that year £180,000 more than was actually paid. This is .88 of a cent per passenger. As the 98,966,658 passengers paid that year £365,761, or 1.8 cents per ride, the average before must have been about 2.7 cents. In 1897–1898 the average receipts from passengers were 1.78 cents, and the operating expenses were 1.34 cents for each of the 106,344,437 passengers. The present schedule of fares, assuming one penny to be equal to 2 cents, is .57 of a mile on the average for 1 cent, 1.74 miles for 2 cents, 2.3 miles for 3 cents, 3.45 miles for 4 cents, 4.15 miles for 5 cents, 5.24 miles for 6 cents. A workingman can travel from about 2½ miles for 2 cents, to about 5½ miles for 4 cents, before 7 A.M., and between 5 and 6.15 P.M. About 35 per cent of the passengers pay only one cent fare, and about half pay two cents. The longest distance is 5¾ miles, and the highest fare is 6 cents.

As elsewhere stated, it is not reasonable to argue from the low fares in Glasgow that American companies with higher wages, longer haul, and less dense traffic could afford the same. Equally absurd is it to hold city ownership or even short-term franchises responsible for the inferior street-car development of Europe. The one irrefutable conclusion from Glasgow is the superiority of public to private ownership under such conditions as prevail in many and probably in most British cities to-day.

Sheffield and Other Cities.

As one result of Glasgow's success, Parliament, in 1896, rescinded its standing order forbidding the introduction of any bill for municipal operation of tramways, and unanimously passed an Act permitting Sheffield to operate its street railways. Other cities soon obtained similar powers. It was also provided that after the expiration of a lease or permit to a tramway company, which can be for only 21 years, a municipality can purchase, "upon terms of paying the then value (exclusive of any allowance for past or present profits of the undertaking, or any compensation for compulsory sale, or other consideration whatever) of the tramway, and all lands, buildings, works, materials, and plant of the promoters suitable to be used by them for the purpose of their undertaking." The obvious interpretation of this Act, that cities need pay only for the structural value of the property less depreciation, has been confirmed by the House of Lords on an appeal from the lower courts. The city of Sheffield has not only increased wages £2,433 4*s.* 8*d.*, or apparently over 10 per cent, and provided uniforms for its employees, but secured, in 1896–1897, a surplus, above interest and sinking-fund, of about $40,000 on a capital of about $650,000, or about 6 per cent. It has also reduced fares from an average of 2.96 cents per passenger to 2.66 cents.

No sooner did Parliament open the door to municipal operation in 1896, than a score of British cities began plans accordingly. Garcke's *Manual* for 1898–1899 shows that public authorities own 42 tramway undertakings, with 571 miles of single track, while 117 private companies own 934 miles. Fifteen of these public owned tramways, with 270 miles of track, were also operated by the cities in the fall of 1898, and a sixteenth, bringing up the total mileage to 318, will be so operated after Jan. 1, 1899. The company last mentioned is one of 24 miles of double track in South London. Nearly all of this 318 miles of track is to be electrically equipped as soon as possible.

The English cities owning and operating their tramways in the fall of 1898 were as follows: —

Cities.	*Population.*	*Miles of Single Track.*
Aberdeen	135,942	10 [1]
Blackburn	129,459	6
Blackpool	35,000	5
Bradford	228,909	9
Dover	33,000	7
Glasgow	703,920	73
Halifax	94,775	4.25
Huddersfield	100,463	22
Hull	225,054	19
Leeds	402,449	14
Liverpool	644,129	48.7
Nottingham	229,775	21
Plymouth	98,121	3.6
Sheffield	347,278	18
South Hampton	100,000	10
		270.55 miles.

[1] Estimated by writer.

The spirit and enthusiasm attending this new development of "triumphant democracy" is illustrated in the ceremonies attending the inauguration of city operation of tramways in Aberdeen, Scotland, in October, 1898, as reported in *London*: —

"There was a great procession through the streets of decorated cars, consisting of 39 cars and 244 horses. The sides and stairs were garlanded with foliage; on each side was a shield encircled by a trophy of flags, and at each end a similar trophy surrounded a shield bearing the city arms. Lines of streamers adorned the upper portion, above the heads of the outside passengers. Six cars, each drawn by four horses, took part in the civic procession at noon. In place of the usual advertisement board along the sides of the cars was a large decorated scroll with the words 'Success to the Corporation Tramways.'"

The Lord Provost and the rest of the city government and leading citizens took part in the demonstrations, which included a banquet with interesting addresses, and a supper in the evening given by the City Council to the 180 tramway employees.

In the investigation thus far, attention has been directed, (1) to the more or less successful efforts of a few cities on the American continent, outside of Massachusetts, to secure large taxes and low fares; (2) to the great success of Massachusetts in preventing any considerable amount of stock-watering; (3) to the restrictions imposed in Berlin

on short term franchises; and (4) to the rapidly rising tide of municipal operation in Great Britain.

Since observations that might be made with regard to the proper kind of a street-railway franchise in case private operation prevails, and some of the broader considerations for and against direct municipal operation, apply equally well in most cases to gas, electric light, and telephones, any further discussion of these points will be deferred until the concluding chapter.

VIII.

GAS.

GAS.

By EDWARD W. BEMIS.

THE HISTORY AND PROSPECTS OF GAS MANUFACTURE.

The small amount of space at the writer's command for this chapter prevents more than a mere reference to the most important points. Proofs at hand for many assertions must unfortunately be omitted.

The importance of the gas question has of late been immensely under-rated by the public. Despite the competition of electric light, and the serious business depression following 1892, the use of gas increased in England 22.4 per cent from 1892 to 1897, or almost as fast as in the previous six years, when the growth was 30.4 per cent. In Massachusetts in the six years ending in July, 1891, the growth was 39.6 per cent, and in the next six years 34.7 per cent.

With the introduction of the Welsbach burner, gas is even proving a formidable competitor of electricity in street-lighting in Europe; while the

rapid exhaustion of natural gas and the cheapening of artificial gas are fast developing the use of this manufactured product for fuel purposes. Mr. Alexander Dow, the electrician, frankly concedes that gas is a much cheaper illuminant than electricity, and is likely to remain so.[1] Even if municipalities continue to use only electric light, it must be admitted that gas is a monopoly, and that the individual gas consumer has no protection from extortion unless it is given by the city and the State. For the public authorities to ignore monopolies that do not sell directly to the State or city is not justified by any of the legal principles and decisions discussed in a previous chapter by Professor Parsons. Unless the American people are blind to their true interests, they will soon demand as great activity in public regulation or public ownership and operations of gas-works as of electric-light plants.

PROFITS.

Gas companies have various ways of concealing their profits, even in the reports they are forced to make to the Massachusetts Gas Commission. Not only are exorbitant salaries, legal fees, and "legislative" or "advertising" expenses often paid, but

[1] Address before the National Electric Light Association at Chicago, June 8, 1898.

directors sometimes justify their title by "directing" the money of their corporations into their own pockets through excessive prices for oil, acetylene patents, or other properties in which they are personally interested. One company may thus buy from another for 60 cents, or even a dollar, in the holder, gas which it can itself make for 20 to 30 cents.

In Boston the cost of putting 885,480,000 feet of excellent water-gas in the holders of the Bay State Company was only 33.3 cents per thousand feet in 1892, with coal at $4.44 per long ton, and oil at 3.37 cents a gallon. With the prices for these materials that prevail between Pittsburg and the Mississippi River, this cost would have been reduced one-third. The cost to the Boston Gas Company in 1892 for distributing 1,191,985,480 feet of gas, largely bought from this Bay State Company, would only have been 19.4 cents had the same expense for salaries per thousand feet (4.345 cents) prevailed as in 1886, instead of 10.8 cents. In this statement taxes (5.473 cents) are included, but not the expense of caring for street-lamps (3 cents), which is not part of the cost of gas making or distribution.

Yet this Boston company, instead of reporting to the Commission total operating costs of 33.3 cents plus 19.4 cents, or 52.7 cents, reported these costs as $1.02. It was only with great difficulty

that an investigating committee of the Massachusetts Legislature was able to secure the real facts as above given from the vaults of the Massachusetts Gas Commission; and when the verbatim report of the investigation was printed by the State, all these data were mysteriously omitted — a common method of regulation of the question of light by keeping the people in darkness.

The two chief Chicago[1] companies signed statements in 1893 to the New York Stock Exchange, showing a total cost of gas at the burner of only 40 cents, even including taxes. The official report of the Mutual Fuel Gas Company of Hyde Park, Chicago,[2] shows that it sold in 1897, 556,887,200 feet of excellent illuminating water-gas for $484,787, an average of 87 cents per thousand feet, at an expense to the company, including taxes, of $208,561, or 37.45 cents per thousand feet. This company had no bonds, and only $1,500,000 of stock, or $2.69 per thousand feet. All it claimed to have in the form of accumulated sur-

[1] See Report of Illinois Bureau of Labor Statistics for 1896, concluding chapter on Gas Companies of Chicago. This report was printed by a new administration, without any opportunity being given to the authors for reading the proof. A few errors thus crept in. Some portions were totally omitted in both the gas and street-railway chapters written by the author; while in the case of the gas chapter, the appendices, with their numbers omitted, were placed before the chapter instead of after it, and several of the same were omitted. This much of explanation is necessary to those who may be surprised at the appearance of the report.

[2] *Chicago Economist. Investors' Manual*, 1898.

plus and tangible assets was $2,119,667, or $3.80 per thousand feet. Even 8 per cent on this would only mean 30 cents per thousand. The company apparently, therefore, could have sold gas at a good profit at 67 cents per thousand feet, and there is abundant information to prove that other Chicago companies could do as well.

Gas can be sold at a profit on the structural value of the plants for 75 cents per thousand feet in most of the cities of over 200,000 people east of the Rocky Mountains. In such cities the cost of duplication of the plants would rarely exceed $4.00 per thousand feet of annual output. In the famous Cleveland Gas Case in 1892, the officers of the leading gas company of that city reported the cost, aside from depreciation and profit, but inclusive of taxes, as 38 cents per thousand feet at the burner. Mr. Barker, chairman of the Massachusetts Gas Commission, testified that seven cents was ample for depreciation, and such has been the experience in the Richmond (Va.) works the past ten years. This would mean 45 cents as the entire cost in Cleveland in 1890 and 1891, aside from profit. Since then the two Cleveland companies, one with an output of only 161,000,000 feet in 1893–1894, and 207,671,000 feet in 1896–1897, have never skipped a dividend of 6 per cent or more, although allowed to charge but 80 cents per thousand feet, and compelled to pay back 6 per

cent of that, or 5 cents, to the city, in addition to the ordinary taxes.

In this Cleveland Case the evidence seemed to warrant the claim of the city's attorney, General Meyer, that without any cash payments for stock save the original $100,000 about 1850, there had been such an issue of new securities without the passing of a single dividend on any of them, that in 1892 an original investor of $1,000 was in possession of $24,000 of securities. On these he was receiving yearly 6 per cent, or 144 per cent on his only cash investment. When the well-known manufacturer of gas meters and gas apparatus, John McIlhenny of Philadelphia, was asked in court his opinion of this, he gave the following illuminating answer: —

"That is not an unusual thing in this growing country at all. It is about the history of all the prosperous gas-works; and it is furthermore about the history, as you have explained it, of all prosperous manufacturing concerns."

The truth of the last part of his answer will be seriously questioned by some business men, but there is abundant evidence of a large measure of truth in the reference to gas companies. In an affidavit in a gas case in Chicago it was asserted that only $100,000 had ever been paid in in cash to the Chicago Gas Light and Coke Company, whose stock, in 1887, was $4,984,000, and which

in that year issued a dividend in bonds of $7,650,000, while the stockholders almost doubled their stock in a consolidation of companies then effected. Only $750,000 in cash was ever paid in to the oldest of the New York companies; yet this company, after paying dividends averaging on this original payment 40% yearly from the origin of the company, had increased its stock, through stock dividends, to $7,600,000 in 1884.

The public are prevented from realizing the profits of these companies by their extensive stock and even bond watering. For example, The Mutual Fuel Gas Company of Chicago, above referred to, was bought by the People's Gas Company in 1898; and in lieu of its $1,500,000 of stock representing $2,119,667 of tangible assets, the purchasers issued $5,000,000 of bonds, making the capitalization $9.00 per thousand feet. It is $9.00 per thousand feet of annual output in all of the Chicago companies; and on this basis they are doing so well with gas at one dollar that all their securities, representing about $20,000,000 of structural value, and $40,000,000 of free gift by the people, are above par.

In seeking a remedy for exorbitant charges in competition rather than the compulsory reduction of charges through State and city authority or public ownership, our municipalities have usually made matters worse. This was illustrated in

the testimony at Cleveland of Captain William Henry White, prominently identified, at different times, with competing companies in Boston, Chicago, Baltimore, Brooklyn, and elsewhere.

"Among the blessings that long-suffering communities have in this country is the competing company. The municipal authorities always feel that the dear, suffering public ought to have additional facilities for getting cheap light, and on occasion they let in an opposition gas company. They produce a new plant, put in all the apparatus and parallel the mains of the other company, and they try for a while to fight; and we have the usual gas war, with its incidental benefits to the public. And then the two companies get together and say, 'Well now, we have done the philanthropic act long enough, and we think the public had better pay for this little picnic of ours.' They unite, and usually double the capital when they unite, of course. And as it happened in Boston, this work went on to a point where the competing company united with the old company, the competing company getting hold of the old company and uniting. . . .

. . . "They said it was a good idea, probably, to extend these benefits to the suffering communities on the outside, and they proceeded to incorporate and consolidate all the suburban gas companies around Boston, and when they got it all together, they found they had a capitalization of about $7,000,000, if my memory serves me right. And upon having made this strong combination, they proceeded then to issue to the long-suffering public 17½ million dollars of capital stock. So that while the municipality of Boston endeavored to lessen the burdens and brighten the pathway of the citizens of that great city, they succeeded in adding additional burdens to them, which is the case fre-

quently all over the country. The same story in Chicago: capitalization there has run up somewhere in the neighborhood of $30,000,000."

The witness stated that on this $10,000,000 "of wind script stock," as well as on the other $7,000,000, the people of Boston had been paying 6 per cent dividends.

Question. — "You felt, you gentlemen, among you, that this was discharging the higher duty that you owed to the community, and that it was the proper example to set to the youth of America in that regard?"

Answer. — "I don't think that the financial intellect that led that operation, — it was out of my department, — but the financial operation which led the people out of Egypt and distress there, didn't consider what the effect upon the youth of America would be, but the effect upon himself."

Question. — "In the language of one who has acted similarly, 'The public be damned'?"

Answer. — "I am inclined to think that that was the foundation principle of the thought. At the same time it gets back to the original proposition that the competing company is not a panacea for the ills the public has suffered. The opposition company is the greatest mistake that is ever made. I get money from building them occasionally. I never organized one."

Massachusetts' Experience.

The Massachusetts Commission, known as the Board of Gas and Electric Light Commissioners, was created in 1885, with certain powers over gas companies. Two years later control was given over electric light companies. Three men constitute the Commission, one being appointed every

year by the governor, to serve for three years, with salaries of $3,500. The chairman, however, receives $4,000, a clerk $2,000, and $1,000 is provided for books, stationery, and other incidental expenses, aside from office rent and the printing of the annual report. The salaries and incidental expenses are borne by the companies controlled by the board, in proportion to their gross earnings. The Commission was given authority to secure as full reports as it might desire as to the expenses and assets of the companies, and at times employs experts to make special investigations of the structural value of the plants. The board annually requires the filling out under oath, and with penalties for false statement, of elaborate schedules of details of the lighting monopolies of the State. The latter must also keep their books in the manner prescribed by the board, and must allow the latter to examine them at any time. On petition of twenty consumers, or of the mayor of a city, or the selectmen of a town, the Commission must give a hearing, make an investigation, and issue an opinion or order relative to the proper price of light; whether a new company should be admitted to a city; whether more securities should be issued; whether better quality of light should be supplied — in fact, almost any grievance of the consumer can be brought before the Commission; and any disobedience of its orders is turned over

to the attorney general, who is expected to take proper legal action to enforce the decision of the board.

The work of the Commission is so much like that of the Street Railroad Commission described in the last chapter that it is not necessary to repeat here what was there said. The Gas and Electric Light Commission, as the final court of appeal, have never allowed a single competing gas or electric-light company in the State, although of course an electric-light company is often allowed in a city where there is a gas company, and some competition may arise between these different illuminants. Where a gas company already in the field has asked permission to build an electric-light plant, permission has usually been granted to it in preference to an independent electric-light company, on the ground that except in the greatest cities there are possibilities of economy in the union of such monopolies.

But the power of wealth has induced the Legislature at three different times to reverse its declared policy, and to incorporate three leading companies in Boston, — the Bay State, the Brookline, and the Massachusetts Pipe Line companies. The Legislature has admitted the folly of its past action by asking the Commission, in 1898, to report a plan for the consolidation of the Boston companies.

The best work of the Commission has consisted in this restriction of new companies outside of Boston, and in its check upon stock-watering. The six companies in the State, other than those of Boston, that had an output of over 60,000,000 feet of gas in 1896–1897, and whose accounts were not complicated by the ownership of electric-light plants, were Cambridge, Fall River, Haverhill, Lowell, Springfield, and Worcester. These six companies sold 447,696,775 feet of gas in 1885–1886, with a capital of $2,563,000, or $5.72 per thousand feet. These same companies, in 1896–1897 sold 983,998,884 feet, with a capital stock and bonds of only $2,825,000 or only $2.87 per thousand feet. If these companies had been located in any other State, their capital, instead of diminishing one-half per unit of output, would have been allowed to increase to $8.00 or $10.00 per thousand feet.

The Commission, however, has been as great a failure in its control of the large Boston companies in this matter of capitalization as in that of competition. The power of wealth at times, without necessarily any direct corruption, rendered the Commission speechless, and made the Legislature its pliant tool; and has shown the difficulty of framing any law for the regulation of millionaires in the ownership of public franchises that able lawyers cannot find a way to avoid.

Ten years ago the Boston companies, with an output of 1,161,000,000 feet, had a capital of $4,500,000. In 1898 the output was almost precisely twice as much as in 1888, while in the words of the special student of this subject, Professor John H. Gray of Evanston, "the nominal capitalization depending on these companies, including some new issues about to be made, is in round numbers $99,000,000;" i.e., an increase of 23-fold.

Mr. Thomas W. Lawson, until lately vice-president and director in several of the Boston companies, and negotiator, as he himself says, "of the various settlements, deals, and organizations that have been consummated or attempted in the Boston gas-field during the last three years," stated over his own signature, in 1897, "The Massachusetts Pipe Line's mongrel charter, procured from the 1896 Legislature, *cost about $500,000.*"

An editorial in the *Progressive Age* for Jan. 15, 1898, says: "In Wall Street such mellifluous expressions as 'The Boston Skin Game' have aptly served to designate the Bay State gas, while the 'Beans Mystery' has been commonly applied to the general situation. . . . The speakers have reasonable ground for the application of invidious reflections."

All this is exceedingly important as showing

that in self-satisfied New England, the home of Puritanism and of Missions, the relation of city monopolies under private ownership is nearly as disgraceful as in many Western cities. The trouble is with the system, which throws enormous temptations in the way of legislators and regulating bodies. European public men might resist the temptation; our own seem unable to do so.

Although the Commission has not often ordered reduction of rates, yet its influence, and the competition of electric light and other causes forced down the average price per thousand feet from $1.72 in 1886 to $1.17 in 1897.

The natural tendency of a monopoly so strongly protected by law as are the lighting monopolies of Massachusetts would be toward lack of progressiveness. The lighting business, however, is almost as complete a monopoly, as a matter of fact, in other States; and therefore the stimulus to progress in improvements is not much diminished by the Massachusetts law, and the action of the Commission has stimulated progress in technical ways. The annual publications of the board, while suppressing certain vital facts necessary to the formation of a correct judgment by the people as to the reasonableness of the charges of a company, do give so many facts regarding leakage, candle-power, etc., as to incite the companies,

possibly, to some rivalry in the reduction of waste, etc. In any hearing, also, relative to the fairness of any existing prices of gas or electric light, or as to issuing new securities, the Commission lays down the principle that the companies must keep fairly abreast with the times in their improvements, or they cannot claim the right to earn large dividends. The Commission has, in a few cases, given specific suggestions to companies relative to extensive improvements needed in their plants, — suggestions which these companies have obeyed. Again, the board prescribes such systematic methods of bookkeeping and classification of expenses as to enable the companies themselves often to realize how their business is being conducted, and where the leaks are located, far better than is possible in the majority of companies in other States.

While the Commission has done admirable work in its prevention of stock-watering and of the formation of competing companies outside of Boston, and has perhaps done something to hasten the decline of prices of gas, yet it has been so timid in its handling of the larger companies, so secretive in its locking up of the facts it gathers from the companies, since it is the only court on record that keeps secret the evidence on which it acts, and has produced the general impression of being so hostile to municipal ownership, that

the people of Massachusetts do not consider the Commission idea more than a half-way measure. Many more cities than the sixteen mentioned in the chapters on electric light would to-day be owning and operating both gas and electric-light works, were it not for the law on the subject, which is usually so executed as to force a municipality under such circumstances to buy out existing private plants at much more than their structural value.

Philadelphia.

The lease of the Philadelphia Gas-Works in 1897 for thirty years, after fifty-six years of public operation and sixty-two years of public ownership, has been widely heralded as an evidence of failure of public ownership.[1] The salient facts, which alone can be here given, illustrate, rather, the extent to which powerful corporate influences will weaken and corrupt government for their own ends when the people are asleep and the spoils system is allowed to prevail.

[1] A full account of the lease will be found in an article by the writer in *The Forum* for March, 1898; by Professor L. S. Rowe, in *The Annals of The American Academy* for May, 1898; and by Clinton Rogers Woodruff in *The American Journal of Sociology* for March, 1898. For an account of the history of municipal gas-works in Philadelphia and other American cities, reference may also be made to the following by the writer: "Municipal Gas-Works in the United States," a monograph of the American Economic Association in 1891, and an article in *The Review of Reviews* for February, 1893.

The works under public operation would have shown better results than were obtained had it not been for the spoils system, general inefficiency, and unprogressiveness. There had been improvement in these respects since direct popular control of the works was secured in 1887, but not as rapidly as at first seemed likely. The responsibility for this of course rested upon the whole community. It had not been sufficiently imbued with the spirit of municipal reform, which, starting in Great Britain, is rapidly sweeping over America.

The masses were overwhelmingly against the lease,[1] but had not the grit to take the leadership into their own hands, or make their power felt. The ordinary business and professional man was ignorant of civic ideals, lacking in civic patriotism, and saturated with the out-of-date and dangerous philosophy that the only way to treat an inefficient government is to clip its wings, instead of to strengthen it for higher and nobler flights.

Another social class, the real rulers of many of our cities, formed part of the Philadelphia situ-

[1] In a vote taken in the twenty-eighth ward of the city by the *Inquirer*, with ballot-boxes and regular printed ballots, just before the lease, the votes in its favor were only 32, and against it 2,583, or 1 to 81. The city council voted down a referendum proposition. The *Progressive Age*, Jan. 15, 1898, frankly admitted that the people would have voted against a lease, and that "it was *artificial pressure* which effected the result."

ation. These were the so-called "leading citizens," who obtained their title by their pronounced success in leading the community in the direction of their private interests, as involved in valuable franchises. Said the honorable Wayne MacVeagh, in a public address during the discussion of the lease, "Every man who votes for this ordinance will go through the rest of his life with the brand on his forehead, 'Bribed by the rich to rob the poor.'"

The United Gas Improvement Company, which for ten years had been delivering to the city's gas-holders more and more of the gas sold, and which finally secured the lease, owns the gas-works in over thirty cities, including Fall River, Jersey City, Harrisburg, Atlanta, Minneapolis, Sioux City, Des Moines, and Kansas City. It was commonly charged in Philadelphia with exerting an hypnotic influence over the city councils, so as to prevent all improvement of the works. The people, by an immense majority, voted $1,000,000 to improve the works only a week before the lease was signed, and would have voted far more, and would have done so years before, if the councils had submitted the matter to them.[1]

How the lease was finally secured is thus de-

[1] On the day the people voted $1,000,000 to improve the gas-works, they voted $11,300,000 for the building of schoolhouses, improvement of the water-works, etc.

scribed by the secretary of the National Municipal League and counsel of the Municipal League of Philadelphia.[1]

"Surrounding the committee rooms and council chambers at all the meetings when the United Gas Improvement Company's ordinance was under consideration was a band of the shrewdest and most skillful lobbyists, and at one time some of them had the audacity to enter upon the floor of the councils, and direct their fight for the ordinance from that point of vantage. . . . Yet despite the public protests, and despite the public indignation, and despite the very much better offers of competing companies, the United Gas Improvement Company, controlled as it is by those who have already secured the street-railway, electric-lighting, and gasoline franchises and privileges, was able to carry the day. And yet there are some people who wonder at the prevailing discontent among the poorer classes, and the growth of that sentiment for which Mr. Bryan stands."

Philadelphia, out of its net earnings, had paid for its works, and had furnished cheaper gas during nearly all of its history than had the private works of New York, Baltimore, and Washington. In 1894 the Quaker City had done what the Standard Oil, Gould, and Sage interests insisted before the

[1] Mr. Clinton Rogers Woodruff, member of the Pennsylvania Legislature, in *American Journal of Sociology*, March, 1898.

New York Legislature in 1897 could not be done without ruin; viz., reduced the price of gas to $1. The works continued to pay operating expenses and depreciation charges, besides furnishing nearly 700,000,000 feet of gas to the city yearly, worth, at even 75 cents, $500,000, or fully 5 per cent on the structural value of the plant.[1]

As a result of the surrender of her gas-works, which thus even in 1897 furnished free public gas, and paid all expenses with a charge to private consumers of $1.00, Philadelphia has secured only 90-cent gas, or its equivalent in a cash bonus, for ten years, 85-cent gas for five years thereafter, then gas for 80 cents for another five years, and for 75 cents for the last ten years of the lease. Yet with the expenditure of $1,500,000, as the director of public works stated in May, 1896, the city could have reduced its price at once to 75 cents, to say nothing of the certainty that gas could be sold much lower long before the end of the lease. The lessees also are to furnish free as much gas for city use as is now so consumed; but that advantage the city already enjoyed. Finally the lessees agree to spend $15,000,000 on improvements and

[1] In 1896 the cash profits were $352,988.80. In the eleven months of 1897, preceding the lease, they were $382,646.12. Against this should be balanced $73,192.37, the cost of collections borne by other departments in 1896, water worth $11,576, and extra expenses entailed upon the auditors' and director's office of about $11,000; also depreciation charges estimated by the excellent authority, Eugene Vanderpool, at $276,500, or a total of about $372,000.

extensions during the thirty years; but this is no more than the ordinary depreciation charge of 5 to 7 cents per thousand feet on the yearly output, which the city met in 1896 and 1897 out of its net cash receipts.

Richmond, Va.

The largest and oldest public plant since the lease of the Philadelphia works is at *Richmond, Va.*, whose population in 1890 was 81,388. There are no data at hand relative to the history of the plant from its construction by the city in 1852 until 1867. At that time the plant naturally showed evidence of having shared in the general ruin which the war had brought upon the city, although there is no evidence that the plant had been badly managed in any way. During the next nineteen years, ending in 1885, the plant out of its net earnings not only paid for nearly $500,000 of extensions, but if the gas used on the streets and in public buildings be reckoned at the same price as that charged to private consumers, the plant also paid the entire cost of the works up to 1867 of about $400,000. The plant also earned an average of 9.7 per cent a year on that capital charge of $400,000. As this capital at the close of the war represented property that had disappeared, and as it was paid for out of net earnings several years before 1886, the percentage of profit

on any actual cash investment of the city was much over 10 per cent. The price of gas during this period gradually fell from $3.00 to $1.50.

During the last twelve years, ending with Dec. 31, 1897, the price of gas has continued to fall, being reduced to $1.25 per thousand feet in February, 1891, and to $1.00 in 1893. During this period the excess of receipts above operating expenses has been sufficient to pay for all the new construction and extensions of $154,775.40, and the lighting and extinguishing of the street-lamps to the amount of $30,203.78, and has left a cash balance of $341,963.47. If to this be added the value of the gas used on the streets and in public buildings, estimated at $1.25 per thousand feet, or about the average price to private consumers, the direct benefit to the city may be computed at $877,399.67, or $73,117 per year. This is 18.7 per cent yearly on the structural value of the plant, which (with over 1,600 street-lamps) could be duplicated for about $570,000, or $3.00 for every thousand feet of output in 1897. On such a capital the excess of cash earnings above operating expenses, extensions, and lighting of street-lamps was $67,065.01 in 1897. Estimating the 11,287,700 feet of public used gas at $1.00 per thousand feet, the price to private consumers, the net profit was 14.6 per cent on the cost of duplicating the present plant, or about 12 per cent after making allowance for depreciation.

In 1897, with coal over $3.00 a ton, and with oil 4 cents a gallon, which is not far from the price in New York and Boston, but much higher than in the middle West, Richmond put gas in the holders at the works for 42 cents, and delivered it at the burner for 57 cents per thousand feet, aside from any allowance for depreciation, or such expenses for interest and taxes as private companies have to pay. The Richmond works provided for all extensions of plant and new construction from 1886 to 1897 by an average expense of only 7.3 cents per thousand feet. The amount of gas used in the burner meantime increased from 148,609,730 feet to 190,737,980 feet a year. The plant, with its water-gas addition, was undoubtedly worth more in 1897 than in 1886. An allowance of 7 cents for depreciation therefore is certainly liberal. Taxes in Massachusetts average 6 cents per thousand feet, but are probably lower in most other States. The inclusion of these two items would raise the cost at Richmond only to 70 cents. Since the plant was paid for fully fifteen years ago out of the net receipts, there is no need of allowing anything for interest; but if it should be added, it would mean only 4 per cent of the $3.00 per thousand feet necessary to duplicate the plant, and would raise the cost only to 82 cents. It is quite likely that certain improvements asked for by the superintendent in his last two reports, and some further

use of labor-saving machinery, would reduce expenses 10 cents per thousand feet; but the results already achieved are so much superior to what other cities gain under private ownership, even where the magnitude of the output and the cost of material are more favorable to cheap manufacture than in Richmond, that people of the latter city will not listen to propositions for the sale or lease of their works.

Mr. John H. Knowles was superintendent of the works from 1870 till 1886; and his son, who for many years has been connected with the plant, has had charge since June 1, 1895. From 1886 until 1895 the works were in charge of one who had been assistant superintendent for the previous sixteen years. One party has been in power all the time, to be sure, but different factions were at the front in different years; no one, however, thought of changing the superintendent for political reasons. Some irregularities and possibly dishonesty were discovered in connection with the works in 1895, but the loss at most was only a few thousand dollars. The present management is very progressive. By a wise provision, the works cannot be sold without a vote of the people; but there is no evidence that the city government has any desire to take such a step.[1]

[1] In this chapter use has been made of the very valuable report of Superintendent Knowles to the City Council of Richmond,

Alexandria, Va., with a population in 1890 of 14,330, has owned its gas-works since 1853. The city is famous for its grass-grown streets, and its contrast in most things progressive with Washington across the Potomac, or even with many Virginia cities.

It is not to be expected under these circumstances that public gas-works should show any striking financial results. Up to May 31, 1897, however, the works, costing $157,225, had been paid for from receipts, and $171,340 in cash had been turned into the city treasury after paying for all extensions, and furnishing all gas needed by the city. In 1897–1898 the cost of the 20,683,500 feet of gas consumed at the burner was 76.1 cents, aside from depreciation. From the difference between 76 cents and $1.33, the charge to private consumers, 2,390,700 feet of gas and $6,000 in money was secured by the city, after some expenditures for the improvement of the works. These results may be compared with the refusal of the vastly better situated Washington Gas Company to reduce its price below $1.25, until 1896, when Congress ordered a reduction to $1.10. In the large suburb of Georgetown the price is still $1.35.

About forty miles south of Alexandria is *Fredericksburg*, the scene of the famous battle of the Civil War, and possessed in 1890 of a population of only 4,528. When this city put in its gas-works in 1891, the people were paying $3.00 per thousand feet for gas. They are now paying $1.50, while the consumption has more than doubled. The total cost to the city, including interest, was only $1.33 in 1896–1897, and will naturally continue to fall with increase of consumption.

in April, 1897, relative to the previous thirty years of administration, and also the annual reports of the plant, and material gathered by the author during several visits to this and the other public-owned gas-plants mentioned in the chapter.

About one hundred miles southwest of Alexandria is *Charlottesville* (with a population in 1890 of 5,562), the seat of the famous University of Virginia, and the home of Jefferson. The gas-works, under the charge of the same manager that has had control since the beginning of city ownership in 1876, long ago repaid the city for all capital costs, and are now selling gas for $1.00 per thousand feet, which is low for that section of country. The total operating expenses, renewals, and extensions for the 11,000,000 feet of annual output are usually from 60 cents to 80 cents per thousand feet, leaving a large profit to the city. In this case, as in many others, part of the profit is absorbed by the city in the shape of free light for streets and public buildings.

On the southern border of Virginia, over one hundred miles southwest of Richmond, lies *Danville*, the great tobacco market of that section of country. This city, of 10,305 population in 1890, has owned its gas-works since 1876, and established in 1885, as has elsewhere been noticed, one of the oldest and most successful electric-light plants in the United States. Under the admirable management of the city engineer, who has had charge since the beginning of city ownership, this gas-plant has steadily reduced the price of gas and the cost of manufacture, while it has also paid for the capital cost. In 1897, with a total consumption of 20,733,300 feet, the operating expenses were 69 cents. In none of these Virginia cities has the spoils system had any apparent influence; and, save perhaps in Alexandria, progressiveness is everywhere apparent.

Wheeling, W. Va., with a population in 1890 of 35,013, is famous for its low charge of 75 cents per thousand feet. This low price is apparently made possible by the cheapness of coal, but it is doubtful if private ownership would

have done as well by the people. The plant has been under public ownership since 1870, and has been paid for out of the net receipts. The operating expenses are usually from 45 cents to 52 cents per thousand feet for the approximately 100,000,000 feet of sales. The excellent public street electric-lighting plant, constructed in part from the net earnings of the gas department, has admirably supplemented the gas-works.

The latter department has not been entirely free from inefficient management. Improvements have not been introduced as fast as they should be; and many would criticise the wages paid, which are very much higher than in neighboring private works. There is good reason for liberality in this matter in the case of public works, but it is thought by some good judges in Wheeling that it has been carried too far.

While it is easy, therefore, to point out some weaknesses in Wheeling, the results on the whole seem to fully justify the almost unanimous belief in public ownership and operation which has always appeared to exist there and in other cities owning their gas-plants.

Bellefontaine, Ohio, with a population of 4,238 in 1890, built its plant in 1873. Like most Virginia cities, it has had great success with city ownership. About one-half of its gas is sold for fuel purposes for about 50 cents per thousand feet, and the other half for illuminating purposes at $1.25 per thousand feet. The operating expenses of the 16,371,751 feet that were consumed from March 18, 1896, to March 18, 1897, were 59 cents per thousand feet for excellent 24 c. p. water-gas. The cost has been less since then. As the plant has been paid for, there is of course no need of earning interest.

Hamilton, Ohio, with a population in 1890 of 17,565, is the only city that has attempted competition with a private

company instead of buying it. The old company was charging $2.00 per thousand feet, and refused to reduce the price or to sell the plant for what the city considered a reasonable price. After much litigation in the courts, the city erected its own plant, and is now selling gas for fuel and illuminating purposes for 80 cents per thousand feet. The private plant has reduced to about the same point.

The city plant, in the twelve months ending Nov. 30, 1897, delivered at the burner about 37,500,000 feet of mixed coal and oil gas at a cost of 43 cents per thousand feet. If to that be added 5 per cent interest on the $200,000 cost of the plant, the total cost would be raised to 69.7 cents. An allowance of 7 cents for depreciation, which has been found ample in Richmond, as already seen, would raise the cost further to 77 cents. A private company would also have to pay from 3 to 6 cents for taxes.[1]

The city seems to have made a poor selection of an oil-gas plant, as a supplement to its coal-gas, and is now increasing its proportion of coal-gas. It always pays to put in the best process obtainable. The plant seems to have been largely free from political influence, and very satisfactory to the people; but many complications would have been avoided if the city could have bought the private plant. It is believed by the present city officials that private gas companies elsewhere are aiding the local company to keep up its fight with the city in the hope of discrediting the experiment. This private company, which claimed in 1890 that it could not sell below $2, is now charging only 75 cents.

[1] The total cost of the plant is only $5.33 per thousand feet of annual consumption, and would have been less had the plant continued to supply streets and public buildings, which it could have done without any increase of plant. The city does this now with its public electric-light plant.

Toledo, Ohio, with a population of 81,434 in 1890, had a most remarkable experience in establishing its own natural-gas plant in 1889–1890, as described in Mr. Lloyd's "Wealth *vs.* Commonwealth," chapters xxii.–xxvi. The trustees report that the opposition of the Standard Oil Company so embarrassed the sale of the bonds, and so increased the price of oil territory, that the city was forced to pay $500,000 more than would otherwise have been necessary for the construction of its plant, and lost $500,000 more in revenue.

Only 41 per cent of the expenses of the plant have been for operation since 1891. The other 59 per cent have been for the purchase of oil-wells, the laying of mains, and the building of a pumping-station. Owing to the rapid exhaustion of natural gas, whether under private or public operation, the city has only been able to pay, out of its receipts, its operating expenses and new construction and extensions, together with $100,000 toward the principal. There remains a debt of $1,050,000, which, however, would not have existed, as already indicated, if the city had been able to proceed without interruption from monopolistic interests. The plant has not paid interest on the investment, but has given the people an advantage worth all the plant has cost, and much more, in keeping down the cost of fuel. The city plant charged only 8 cents per thousand feet in 1891, 15 cents in 1892, and has charged 20 cents since 1894 per thousand feet. The private plant has not ventured to charge much more, although it raised its rates Sept. 1, 1898, to 30 cents.

Mayor Jones is now urging the construction by the city of a good water-gas plant to supplement the natural gas. This supplementing of natural gas has been tried for several years in Louisville, Ky., by the Kentucky Heating Company; and the mixed product has been sold for a

good profit for 35 cents per thousand feet. Water-gas of 24 c. p. is put into the holders in Chicago for 20 cents per thousand feet by a private company, and equally good offers have been made to the city of Toledo by the owners of a good gas process. The cost of distribution in 1892 in Toledo, when the output was about 1,500,000,000 feet, was under 2 cents per thousand feet. In 1897 the cost, with estimated sales of 272,000,000 feet and 1,100 consumers, was 5.5 cents. The city of Toledo ought certainly to follow Mayor Jones's suggestions at the earliest possible moment, or there will be a lease of the works, as in Philadelphia.

In Kentucky the city of *Louisville* owns $925,000 of the $3,600,000 of stock of its gas company. The city has thus had an interest in the company ever since its start sixty years ago. The price of gas for illuminating purposes is $1.30, and for fuel purposes 75 cents. As there are $500,000 of bonds, the total capitalization is over $10.00 per thousand feet for the nearly 400,000,000 feet of annual consumption in 1897. This is probably three times the cost of duplicating such a large plant; but the city has not had control of the management, as it has never owned a majority of the stock, save early in 1870. For a short time then the city chanced to have a majority of the stock, through its payment for extensions; but instead of using the chance to get control of the management and making further extensions from bond sales, it permitted the private owners to have more stock in return for some further payments for extensions.

The only city in Kentucky which operates its gas-plant is *Henderson*, a great tobacco market on the Ohio River, with a population in 1890 of 8,835. The city bought the plant in 1866 on the failure of a private company, and leased it until 1882. Since then it has directly operated the plant with general satisfaction, so far as can be learned on several visits of the writer to the city.

In 1897 the plant made 14,000,000 feet of gas, and had 9 per cent leakage. The cost of the remaining 12,800,000 feet of one-third water-gas and two-thirds coal-gas was 74 cents per thousand feet, aside from depreciation and interest charges. The plant was long ago paid for out of the net earnings, save for some extensions and improvements recently made. The price, which had been $1.50 up to 1891, was $1.25 from then until 1894, and since then has been $1.00. Few changes have ever occurred in the management. For more than ten years after city operation began, the superintendent was retained who had had charge under private operation.

In *Massachusetts* the interest in public operation of lighting-plants has been greater than in most States, but in the case of gas has hitherto been kept in check by legal restrictions. A city or town entering upon such ownership must buy out the existing plant if the latter asks for it, and at a price fixed by a board of arbitration under the control of the courts. Until very lately, but not so clearly now, the law has seemed to require such arbitrators to value not only the tangible assets, but the franchise. It is also necessary for each branch of the city council to approve of public ownership for two successive years by a two-thirds vote, before it can be submitted to popular vote. The mayor also may veto the vote of the council in either one of these two years, in which case the proposition for city ownership must be again passed by a two-thirds vote, through both branches of the council, although this can be done, of course, immediately after the veto. In case the people vote against city ownership, at any annual municipal election, no similar vote can be submitted until the expiration of three years thereafter. Such restrictions upon popular suffrage are of course beyond reason. Yet two towns, Wakefield and Middleborough, entered upon city ownership and oper-

ation in 1894; and a third, Holyoke, has voted to do so, and in the fall of 1898 was arranging the details of purchase, while Westfield, Mass., has voted to follow Holyoke's example.

In *Wakefield*, with a population in 1895 of 8,304, the average price of coal-gas in 1897 was $1.75 for the small consumption of 6,525,000 feet. The operating expenses are about $1.00. The difference between that and the selling-price is equal to about 6½ per cent on the cost of the plant. If the price had been kept at $2.19, which was charged by the private company in 1893, the city would more than cover the high depreciation of 5 per cent on the cost of the plant, which is counted as part of the expenses by the Massachusetts Gas Commissions. Even at the price charged, the city, despite its small size and the high price of coal and oil in Massachusetts, is earning an ample amount to cover interest at 5 per cent and an ample allowance for depreciation on a new plant. However, the city was forced to pay the old company much more than those now in charge believe the plant was worth. A gas-plant, for an output of even as small an amount as 6,000,000 feet a year, can be built for much less than $11.37 per thousand feet, which is the present nominal value of the Wakefield plant, based on the price paid for it in 1894. The private company, even at a much higher charge for gas, and though supplying some neighboring towns not supplied by the city plant, was not a success financially; and the city seems on the whole to be doing much better than did the private company. The works have much improved, and as soon as the capital account can be reduced to a reasonable figure the works will show good results.

With respect to *Middleborough*, with a population of 6,689 in 1895, there are few facts at hand. The report for 1897–1898, however, shows that the income exceeded operating expenses about 15 per cent, although this is not

enough to cover interest and depreciation on the cost of the plant, which seems to have been excessive for the same reasons that effected the Wakefield plant. The output is very small, being only about 3,500,000 feet. The latest word from the management of the plant indicates extensive improvements during the past year, 1898, and general satisfaction with city ownership. Political influences do not appear to enter into the management of these small Massachusetts plants.

In the summer of 1898 the city of *Duluth, Minn.*, with a population in 1890 of 33,115, entered upon city ownership and operation of its water and gas works, paying for both plants $1,250,000. It was the estimate of the engineers that the two plants could be duplicated for less than $1,000,000, but it was thought wise to pay the amount indicated in order to get rid of private ownership. Extensive improvements have been made, and the price of gas is to be immediately reduced from the present charge of $2.00.

Of these twelve cities now operating their gas-works, all but four — Richmond, Fredericksburg, Charlottesville, and Duluth — also own and operate electric-light plants, and with regard to the gas-works the following conclusions may be safely drawn: —

1. That the people believe they have gained through public ownership and operation, and wish to continue it.

2. That political influence is not seriously handicapping any, with the possible exception of Wheeling.

3. That progressiveness is characteristic of all plants save Alexandria.

4. That the influence of the spoils system in some cities does not appear to have anything like the demoralizing influence on the city government that is produced by the efforts of private companies elsewhere to secure valuable franchises.

5. That it is possible to find some private plants that are managed more economically than some of these public plants, but it is doubtful if the average in private plants of the same size is superior. In the Thirteenth Annual Report of the Kansas Bureau of Labor and Industrial Statistics for 1897, a condition of inefficiency in private gas-plants of that State is shown, that is worse than has been discovered in any of the public plants. One large plant, for example (Report, p. 93), admits to the bureau a loss by leakage and condensation of 25 per cent of its output of 42,000,000 feet. Another, with 5,156,820 feet, reports a loss of 21.2 per cent; while one private plant does not keep any account of leakage, and another has no station meter to determine the amount of gas made at the works.

6. Whether or not the management from an engineering point of view in these public plants is better than the average of the private plants, there is abundant evidence that the consumer and the tax-payer are better treated under public

operation than under private operation in cities of substantially the same size and situated in the same section of country.

Great Britain.

Municipal ownership and operation of gas-works in Great Britain has developed less rapidly than in the case of electric light and power, not only because of the great expectations from the new system of lighting and its special appropriateness for street illumination, but because gas legislation being much older than that of electric light, English legislators did not guard the rights of the people as carefully in the case of the former as of the latter. Electric-light franchises or permits from the local government board are always for twenty-one or forty-two years. At the end of that time cities may purchase on payment of the structural value.

In the case of the gas companies, there has usually been no restriction of time. Hence, in case of public purchase, cities have to pay for the capitalization of the earning power.

Gas-works also were established in most places before the modern spirit of municipalization had been aroused; and therefore city ownership of gas-works must come almost entirely through purchase of existing plants, rather than through the erection

of the first plant of its kind in the place, as in the case of electric light.

The Local Government Board regulates the private companies in the matter of stock-watering as rigidly as it does in Massachusetts; and while companies are allowed to declare average dividends of 10 per cent on certain of their older paid-up capital, on all new issues of stock of recent years they are only allowed to declare 7 per cent, and on bonds 6 per cent, while the new capital, since 1887, must always be sold at auction. This is more rigid than the Massachusetts provision, which allows the Gas and Electric Light Commission to fix the premium. The Commission, as in the case of street railways, is said to fix the premium below the market value, thus allowing some unnecessary increase in capital. In Great Britain it is customary for the Local Government Board to fix a sliding-scale, allowing the companies' dividend to be raised by 1 per cent for every reduction of 2 cents in the price of gas, and *vice versa*. Another system is to permit the price to fluctuate between the maximum and the minimum, — say, between 70 and 80 cents, — and then apply the regulation of dividends to prices above and below that. Municipalities then test gas-meters and examine gas, which must be of a certain standard, and can obtain authority from the Local Government Board to purchase gas undertakings, unless the company supplies several dis-

tricts, in which case the leave of Parliament must be obtained.

The proportion of gas sold by municipalities grew from 31.7 per cent of the total in 1882 to 36.9 per cent in 1897, and the number of companies from 148, or 29.6 per cent, to 208, or 32.45 per cent of the total, in 1897. Outside of London one-half of the gas supplied is by municipalities, and the latter reach one-half of the gas consumers of the United Kingdom. From their lower prices it results that the average consumption outside of street-lights by the 1,406,456 patrons of public companies, averaged about 27,488 feet in 1896–1897, and the consumption of 1,439,272 patrons of the private companies averaged 46,266 feet. Divide the total receipts and expenditures of the public companies and the private companies by the total consumption of each, and it appears that the average receipts in the private companies were 86 cents, and the average expenses 63 cents, leaving a profit of 23 cents per thousand; and in the case of the public plants the average receipts were 74.96 cents, and the average expenses were 56.3 cents, leaving a profit of 18.36 cents. Although the receipts in both cases include receipts from residuals as well as from gas, it is certain that the average price in the private companies is fully 10 cents per thousand feet higher than in the public companies. Yet the latter are required by law to earn enough to

pay interest on all outstanding obligations, and accumulate a sinking-fund to pay off the entire debt in from thirty to fifty years. The public companies average sales of 207,370,000 feet, and the private companies 170,325,000 feet. The public companies, however, were at a greater expense in one respect for the sale of their gas, because they had to deal with a larger number of consumers per million feet of output. The total capital that has been raised or borrowed in the public companies averaged $2.99 per thousand feet of annual output, and in the case of the private companies $3.27. Much of the public capital, moreover, has been counterbalanced by sinking-fund accumulations.

A very valuable yearly statement in classified form of the accounts of the leading gas companies is published yearly by John W. Field.[1] Mr. Field groups together eight public plants, — Birmingham, Bolton, Carlisle, Leicester, Manchester, Nottingham, Oldham, and Salford, — and ten private plants, — Bath, Brighton, Bristol, Derby, Liverpool, Newcastle-on-Tyne, Plymouth, Portsea, Rochester, and Sheffield. In 1897 these eight public companies sold 15,096,679,000 feet of gas, with an original capital of $2.06 per thousand feet, less 57 cents paid off or in the sinking-fund; i.e., with a net capital of $1.49. The ten private companies

[1] Eden Fisher & Co., 7 Clements Lane, Lombard Street, E. C., publisher. Price, 15 shillings.

sold 12,905,402,000 feet with a net outstanding capital of $2.64 per thousand feet of annual output. This gradual reduction of original capitalization without higher charges than those of private companies will enable the public companies in time to dispense with all capital charges. The average "capital employed" — apparently the structural value — was $2.60 and $2.46 in the case of the public and private companies respectively. The average prices in these two groups have been about the same for the last few years. The price of the private plants has usually been a little higher. In 1897 it was nine-tenths of a cent lower, being 54.18 cents per thousand feet, as contrasted with an average of 55.04 cents in the case of the public companies.

For convenience in these computations the English penny is reckoned as two cents. To be precise, however, the private and public charges averaged respectively 55.07 cents and 55.95 cents. To counterbalance this slightly higher charge the public plants paid .44 cents more taxes, and after paying interest, depreciation, and sinking-fund charges, turned into the city treasury 6 cents of profit, instead of distributing dividends to stockholders.

The total operating expenses and taxes were 39.6 cents for the private companies, and 38.66 cents for the public companies. The cost in the

holder was 29.96 cents for the private companies, and 29.46 for the public. The distributing expenses, aside from taxes, were 7.12 cents per thousand feet for the private companies, and 6.24 cents for the public companies.

From personal correspondence it is learned that the stokers, or retort-men, average $1.35 a day in Belfast, $1.22 in Manchester, $1.26 in Birmingham, and $1.35 in Glasgow, in all cases for eight hours; while the Report of the United States Senate Finance Committee (The Aldrich Report) and other accessible data show that the average wages in America are about $2.18 for twelve hours' labor.

With regard to more unskilled labor, such as coal and coke handlers and laborers at the works, the wages in these English cities for eight hours are from 62 cents in Belfast to 78 cents in Glasgow; while in America, for from ten to twelve hours, the wages are about $1.50 to $1.75. If these wages be all reduced to a common day of ten or twelve hours, it will be seen that American wages are about 25 to 30 per cent higher than those of Great Britain. In the case, however, of those employed in the distributing system, such as bookkeepers, collectors, etc., the difference is less. The average wages for the entire plant are not over 25 per cent higher in America.

The cost of gas in the holder in America for

plants of as large an output as these eighteen English plants is usually less than the 29 to 30 cents just quoted from England, despite the difference in wages, because of the lower cost of oil and coal in America. The cost of pipe, coal-gas retorts, water-gas apparatus, lumber for buildings, land, etc., is as low as in England, if not lower. A large contract for water-pipe in Hastings and another British city has just been awarded to Messrs. R. D. Wood & Co. of Philadelphia, the lowest bidders, and gas-pipe costs about the same as water-pipe.

Neither, then, in the cost of construction nor the cost of gas in the holder, is there any reason for the expense being greater in America than in Europe. If we assume that the cost of distribution of, say, 7 cents, aside from taxes, of these large English cities to be increased one-fourth, and American taxes of even 6 cents added, there would still remain a total cost of distribution of only 15 cents to add to a cost in the holder of 20 to 30 cents. There is no reason why, with as wise granting of franchises or as economical public management as in English cities, gas in cities of the same size should not be as low, within at least 5 cents per thousand feet, in America as in Great Britain.

According to Brown's "Directory of American Gas Companies," the total consumption of gas in this country was only about 51,500,000,000 feet

in 1893. The consumption in Great Britain, with half the population, was 101,886,371,130. There is surely a close connection between the fact that the English consume four times as much gas per capita as do we, and the other fact that gas is sold for less than 75 cents per thousand feet on the average, or only at about half of current American prices. These lower prices, with the great social as well as financial benefits resulting therefrom in the saving of labor from the substitution of gas for coal and oil, are not due to any great difference in the cost of placing gas in the burner in the two countries. Rather is the lower price and more extensive use of gas abroad due to the public control of private management, and to the prospect of city ownership ever impending over the English private companies, if they do not fairly approach the record of the public-owned companies.

IX.

REGULATION OR OWNERSHIP?

REGULATION OR OWNERSHIP?

By EDWARD W. BEMIS.

From what has gone before, it is evident that there must be either strict regulation or public ownership, with or without public operation, of city monopolies. It is proposed in this closing chapter to discuss, with the brevity that the space at command compels, the methods of regulation where that form of control is preferred, and the arguments for and against public ownership and operation, together with the methods of bringing about and conducting public operation if such operation is desired.

It must be remarked in the first place, however, that public education and a courageous leadership by public spirited men are fundamental to the success of either regulation or public ownership. Little can be done where conditions are such as existed in Minneapolis in 1894. At that time an outside electric company offered to erect a plant of a thousand electric lights for Minneapolis, and sell it to the city for one dollar at the end of five

years, if, meantime, it might receive $150 a year per light, which was the price the old company was getting. It was found by the city engineer, after a careful investigation, that the new company could afford to make this proposition. But such was the influence of the old company on the press and council, and such the ignorance of the public, that the contract with the old company was renewed for five years at the old price of $150.

City councils should follow the example of the one in Ithaca, New York, which, in February, 1898, appropriated money to buy $25 worth of books on municipal questions for the use of the councils; and, on the request of members or of city officials, money was also appropriated for periodicals along the same line. The world is moving so rapidly in the solution of municipal questions, and corporate greed is so eagerly pouncing upon city governments before it is too late in order to seize what privileges are left, that the people and their officers must exercise constant vigilance, and keep abreast of what is going on throughout the country, if they would not see their municipal birthright given away.

Every city charter and State law on these municipal monopolies should provide the following methods of regulation:

1. The terms of a proposed franchise should be

published at least one month before a grant is made in order to admit of public discussion. And there should be a provision for a popular vote on the granting of new franchises or the renewal of old ones, and on the purchase and operation by the people of an existing monopoly, whether its franchise has expired or not.

The proposed new charter for Minneapolis [1] provided that no city franchise should be granted "unless the question of granting the same shall be first submitted to the qualified voters of such city, and adopted by a majority voting at such election on the question;" and it provided further for a vote of the people upon acquiring or constructing a plant for any of the public purposes usually performed or undertakings known as city monopolies. The city council was to decide whether to submit such propositions to the public. No municipal service plant once owned by the city could be sold or leased unless the transaction was ratified by a two-thirds vote of all the people voting thereon at a city election.

The proposed San Francisco charter provides that "every ordinance involving the grant by the city and company of any franchise for the supply of light or water or for the lease or sale of any public utility" must be ratified by the people.

[1] It recently failed of ratification, though indorsed by more than half of the votes cast.

Whenever a petition equal to 15 per cent of all the votes cast at the last preceding general election is presented to the city government in favor of the acquisition of any public utility, and a vote of the people thereon is requested, such a proposition must be formulated by the city government and presented to the people. The legislative branch of the government must present a plan, and the mayor may, if he desires, submit an alternative plan. The legislative branch of the city may also submit such a proposition to the people, without such petition.

In both the Minneapolis and the San Francisco charters, bonds cannot be issued for the acquisition of a municipal plant without the ratification of two-thirds of those voting thereon.

2. A company should be guaranteed a monopoly for a whole city, unless the city be as large as Chicago, in which case a company should be guaranteed a monopoly of its section or grand division of the city.

3. No extension of a franchise should be made till within one year of its expiration. This, if embodied in a charter of that city, would prevent a shrewd corporation from taking the people unawares, when a council was in office that was not elected on the issue of an extension of franchises, as is so common now.

All extensions that can possibly be made by an

existing company should be so made, in the way prescribed in the Berlin street-railway franchise given in Chapter VII.[1] This follows as a natural corollary from guaranteeing a monopoly. There are exceptional conditions where a new company might concede low fares if permitted to invade the territory of an existing company. If, however, it is possible to reduce charges, the city government can often force it on the old company, through its reserved right to fix reasonable charges, unless prevented by the terms of the franchise. If the latter are for short periods, however, as they should be, it would be far better for the city to await the expiration of the franchise. Two companies in the same district mean duplication of power houses or manufacturing plants, etc.

When an existing company is allowed to extend its plant to new streets, the permit or franchise therefor should expire with that of the rest of the system, in order that the city may then have the opportunity to deal with the entire operation of the monopoly throughout the city. In order that such a requirement should not interfere with extensions, there should be in the franchise of the original company such provisions as have been noticed in the Berlin contract with its street railways, under the terms of which the city agrees to

[1] Pp. 562–565. As far as possible, all the provisions of the Berlin franchise should be included in franchise grants.

bear part, or even all, of the expenses of extensions, according to the time still to elapse before the end of the franchise.

The advantage of having all franchises of a city expire at the same time, and then putting up a new franchise at auction, is illustrated by the offer made to the Chicago city council as this goes to press, Jan. 9, 1899, by Lamson Brothers & Co., members of the Chicago Board of Trade, and others, claiming to represent $35,000,000 of capital in Chicago and New York. This syndicate offers to take all the Chicago street-railway lines at the expiration of the grants in 1903, buying all the property used in the street-railway business at a fair valuation, and then to grant universal transfers, so that a passenger can go from the extreme northern or western limit to the extreme southern limit of the city for a single fare. They furthermore agree on a 25-year franchise to sell tickets good between 6 and 8 A.M. and for children between 6 and 12 years at all hours at the rate of 10 for 30 cents.

4. Right of petition to some State or local board by those residing or owning property upon a street along which a new railway is proposed, as provided in the Massachusetts law of 1898. The Illinois law, which requires the consent of the majority of abutting property owners before a franchise can be given, is very bad, since it opens

the way to the purchase of such consents at high prices by the railway company. The Massachusetts law merely provides for a hearing by the State Board of Railroad Commissioners, after the granting of a permit in a street by a city government.

5. Local authorities should determine what new franchises are needed and in case there is no existing company prepared to undertake the same, should offer the franchise to the best bidder, if the public do not wish to operate directly. This bid may be in the direction of low fares, or of a money compensation as the public may prefer.

6. All the Massachusetts restrictions on overcapitalization should be rigidly applied, and a State commission should see to the enforcement of such restrictions. The preceding chapters on gas and street railways describe these Massachusetts methods.

7. The disposition to be made of the property of a monopoly at the expiration of its franchise should be carefully provided for in the franchise itself. It may be provided that the city can have the plant without any payment. This would be very good, in case the private company could be induced or forced to keep the plant in thoroughly good condition up to the end of the franchise term under such a provision as this. Otherwise it would be better to give the public its share of the

profits of the franchise in lower charges, and let the city possess the right to buy the plant of the private company at the end of its franchise at its structural value, independent of its earning power.

8. Publicity and public audit of accounts and inspection of the quality and safety of the service rendered by a monopoly are essential to intelligent action by the people. In enforcing such requirements, the mayor, the city and State governments should be permitted and encouraged to seek the best professional talent in the whole United States or abroad, according to the well-known principles that obtain in foreign municipalities. Unless this is directly specified in the State Constitution, or in the State Legislation, or in the City Charter, the same difficulty will be sure to arise which now confronts a prominent city west of the Missouri River. As one condition in permitting consolidation, this city was at some pains to secure the appointment of a gas-inspector who would make the proper chemical and photometric examination of the quality of gas used; but this city now finds that it has no such expert in the State, and is prevented from hiring one elsewhere by the law that requires all officials to be citizens of the State, while the prevalence of the spoils system deters any expert from trying to become a citizen of the State for the purpose of becoming a candidate for

the office. A sidewalk inspector consequently is made gas-inspector.

9. Every American State might well adopt a Local Government Board like that of England, with the right to enforce the restrictions on capitalization, and supervise and audit the bookkeeping of all publicly and privately owned municipal monopolies. But great care should be exercised to prevent such a board from keeping secret its accounts, and exerting a repressive influence on the will of the people in the matter of municipal ownership. In our larger cities this regulation of privately owned monopolies should be intrusted to a city commission, composed of the mayor, comptroller, city engineer, and auditor, who are directly responsible to the people most concerned.

Under private operation it is possible to have franchises of long or short duration, or even revocable at will, as in Massachusetts and the District of Columbia.

LONG-TERM FRANCHISES.

The famous Massachusetts Special Street Railway Committee, in its recent report, shows an astonishing misconception of our political conditions when it states, page 22: "If our municipalities or corporations choose from over-eagerness or for other reasons to enter into ill-advised or improvident agreements, which they afterwards

repent, that is their affair; and the officials entering into such agreement are responsible to their constituencies, whether the body of citizens or the holders of the companies' stock. It certainly is not the part of the Commonwealth, either to prescribe the terms of the grants, or after they are made to examine those terms with a view to seeing that they contain nothing of which the parties to them may thereafter repent."

As a matter of fact, when officials make a 50-year franchise contract with a street-railway or gas company, in return, perhaps, for a big bribe, the defeat of such people, when they come up for re-election, is small consolation to a community, and is scarcely any safeguard at all.

Equally absurd is the suggestion of this same Massachusetts Special Committee (page 33), that we may wisely allow foreign countries to experiment with municipal operation, "sure of our ability at any time to appropriate all the results of foreign experience." If our companies meantime secure 50-year to 1000-year franchises, how much ability will we have to follow foreign example unless by purchasing at an enormous price the franchise we have just given away?

According to this same report, page 71, the following twenty-one States place no limits upon the length of street-railway franchises which their municipalities may grant: Arkansas, Connecticut,

Delaware, District of Columbia, Florida, Maine, Massachusetts, Nebraska, Nevada, New Hampshire, South Carolina, New Jersey, New York, North Dakota, Oregon, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, and Wisconsin; although in Omaha there is an exclusive grant for fifty years, and in Greater New York the charter limits such grants henceforth for twenty-five years, and allows a renewal for twenty-five years more. Two States, Louisiana and Mississippi, permit 99-year franchises; North Carolina allows sixty years. Eleven States allow fifty years, namely: Arizona, California, Illinois, Kentucky, Minnesota, Missouri, New Mexico, Texas, Utah, Washington, and West Virginia; although Sacramento is limited to twenty-five years, and in Texas, unless specified in the charter, no franchise can be granted for more than twenty-five years. Maryland allows a 40-year grant. Two States permit thirty years: Georgia and Michigan. Five permit twenty-five years: Alabama, Colorado, Indiana, Iowa, and Ohio, although Denver is limited to twenty years. Four States allow but twenty years: Kansas, Montana, Oklahoma, and South Dakota. Wyoming allows but ten years.

Some prominent advocates of private ownership admit most of the criticisms usually passed upon such ownership, but claim that the solution lies in

long or unlimited franchises, with provisions in the contract for a system of sharing of profits with the public, and a reduction of charges when profits permit. These views were presented in *Municipal Affairs* for September, 1897, by Mr. Edward E. Higgins. There are two most serious objections to this. First, that it violates a principle that is coming to be more and more recognized and desired, viz., that no generation should bind its successors, when it can be prevented without serious loss of national honor and strength. The second objection is the impossibility of foreseeing the progress of the arts for 50 years and of providing for it and for the growth of a city by a wise contract.

How impossible it is to legislate for conditions 50 or even 30 years in the future, in this age of wonderful invention, is well illustrated by the scale of rates established for the ferry across the Chicago River in 1829, viz., $6\frac{1}{4}$ cents for foot-passengers, 25 cents for a one-horse business wagon, 50 cents for a pleasure vehicle, and $6\frac{1}{4}$ cents for every bushel of grain. Had the State Legislature then attempted to fix the rates of fare across this river for 50 years at what might at that time have been reasonable rates, it would have been no more absurd than for the Legislature to do it now, even admitting, as no one acquainted with the subject will do for a moment, that present rates of street-car fares are reasonable.

When the first bridge, a floating one of rough logs, was thrown over the Chicago River in 1833, by the help of the United States troops stationed at Fort Dearborn, and the city contributed towards the structure $286.20 and the Pottawotomies $200, the people were as capable of realizing the conditions of to-day, and of legislating for them, as are we for those of a half a century hence.

On Feb. 16, 1848, a contributor to a Chicago newspaper, *The Democrat*, wrote in favor of plank roads as superior to railroads. He said: —

"Do railroads give the same facility for traveling that plank roads do, even to those living by the side of them? Their stations are generally ten or twelve miles apart. They will only take in and put out passengers at these places. Our plank-road passengers travel at the rate of ten miles an hour, which is as fast as they are conveyed (and with ten times the safety) on the Michigan Central Railroad. The charges made by the railroad for the transportation of produce are more than it would cost the farmer by plank roads, and very little less than common roads."

What would have been more ridiculous than for the men of 1848 to have tied the hands of the city council of Chicago as to how they could regulate the steam or street car lines entering or passing through the city in 1898; and yet our city councils are asked to make contracts for 50 years and even longer.

The well-known reformer of Philadelphia, Mr.

Charles Richardson, in his paper Dec. 1, 1898, before the National Municipal League, puts the argument very tersely: "Under existing conditions the chances of any city obtaining a 50-year or other long-term agreement which will be entirely fair and desirable for the people, or of securing what might be even more difficult, a full and satisfactory enforcement of such an agreement if one could be made, seem to be too slight for serious consideration. Even if it were practicable to secure such an agreement and its continuous enforcement, its effect upon the character of the local governments must necessarily be exceedingly injurious. A bad servant who can be dismissed is much better than a master from whom it is impossible to escape. Republican institutions are based upon the principle that the people should have the power to change their rulers without resorting to assassination or revolution, and a long lease of an important municipal service is simply the substitution of a limited monarchy for a popular government so far as it relates to that particular function."

Dr. Albert Shaw puts it even more forcibly in the New York *Independent* for May, 1897: "Our cities to-day in various States are passing through a great crisis because of an enormous combination of street-railway interests that is attempting, by concerted movement, apparently, from

one end of the country to the other, to break down honest and able municipal government for the sake of obtaining 50-year extensions to their franchises. There is no excuse for a 50-year franchise in this enlightened age of the world. Even if municipal officials have the right to give away valuable assets that belong to their own generation, they have no right to sacrifice posterity. Any man claiming intelligence, and occupying an official position, whether in a legislature or municipal government, who works, speaks, and votes for measures intended to make it easy for such great corporations to get 50-year extensions, is *prima facie*, a rascal."

In case a municipality is burdened with a franchise of long duration, and desires to purchase the same with a view to direct operation or a new lease for a short period, it would be wiser to begin by forcing such reduction of charges as the courts will permit. This is entirely legitimate, and will reduce the market value of the stock more nearly to the structural value of the plant than it would otherwise be. City ownership would not then involve so large a purchase of water as if it were not preceded by regulation of rates.

SHORT–TERM FRANCHISES.

The trend is away from 50-year franchises, or longer, to about 20 years or less, in both this

country and Europe. It has already been noticed that Ohio repealed her 50-year law after two years; and Illinois is demanding the same action regarding her similar 50-year Allen Law, passed in 1897. The latest municipal charters are those of San Francisco, which restrict street-railway franchises to 20 years, and of Minneapolis, which proposed to restrict all franchises to 10 years. The Special Committee on a model city charter reported to the National Municipal League in December in favor of limiting all franchises to 21 years.

According to the Massachusetts Special Street Railway Committee (Report, page 20) these limited franchises are said to be "productive of dissension, poor service, scandals, and unhealthy political action." Such conditions, unfortunately, are characteristic of private ownership and operation of city monopolies under all sorts of franchises in America. Quite possibly short franchises keep street-railway questions prominently at the front in public discussions. Any evils resulting from this are more than counterbalanced by the resulting education of public opinion. It is a case where peace is often death. When a community is found resting content with enormous monopoly profits and high charges in its city monopolies, it deserves the rebuke recently administered by Governor Pingree to the Michigan Board of Railway Commissioners. They had congratulated them-

selves and the public on the friendly relations existing between them and the corporations they were supposed to regulate and supervise. "You have no business to have the relations so friendly," remarked the then mayor of Detroit.

FRANCHISES REVOCABLE AT WILL.

In theory such franchises are excellent, if accompanied by the Massachusetts and English restrictions on capitalization, since they permit the reduction of fare and other changes, such as in motive power from overhead trolleys to underground conduits, etc., when demanded by municipalities, and when, in the opinion of our universal source of appeal, the courts, the private company concerned can afford such concessions, and still earn a fair profit on its necessary cash investment. Such a tenure, however, while working fairly well in Massachusetts, would certainly open the way elsewhere for all manner of "hold-ups" or raids by unscrupulous councils, and of corrupt and demoralizing actions by private corporations.

This method broke down, even in the case of the street railways of Massachusetts, the moment it threatened to be burdensome to the wealthy interests involved. No Massachusetts city has ever revoked such a franchise. An official of the

State Railroad Commission assured the writer two years ago that his commission would probably be able in some way to check such action, and anyway the Legislature would almost certainly interfere by new laws if it were attempted. Moreover, no issue of municipal bonds for a city street-railway plant could ever occur without the consent of the Legislature. But the Legislature in 1898 definitely took away the power of municipalities to revoke street-railway franchises without the consent of the State Railroad Commission. No new conditions can now be imposed on existing street-railway companies by municipalities, even in return for concessions of new territory; while the West End Company of Boston, as described in Chapter VII., has been granted 5-cent fares for 25 years, and has been allowed to make a lease for the same length of time to the Boston Elevated Company, for 8 per cent on all its preferred stock, and 7 per cent on its common stock, guaranteed free of all taxes, although there is good reason for believing that a portion of the latter stock represents no existing structural values.

PUBLIC OWNERSHIP OF THE TRACK AND PRIVATE OPERATION.

This recommendation of the Massachusetts Special Street Railway Committee has three great

advantages. First, it would enable part of the capital necessary for street railways to be borrowed at low rates of interest, which would justify a reduction of fares. Second, it would give the city greater control of its streets, and secure the merging of track and pavement so as to cause less trouble to wagon wheels and bicycle. Third, the city would be in better condition to deal with troublesome private companies.

It might also be better able to secure the introduction of underground conduits when preferred in the heart of large cities. On the other hand, where cities are badly governed, public ownership of the track might stand in the way of such improvements, and in the average American city might increase the unfortunate relations and bargains with councilmen so common to-day. Such a mixture of public and private ownership is liable to prove worse under American political conditions than would either form of ownership by itself, as was the case with the Philadelphia gas-works described in the preceding chapter. Public ownership of the track is evidently only a half-way measure, although probably better than no public ownership at all.

THE OHIO METHOD.

Since 1854, Ohio city councils have had the power to fix by ordinance the price of gas for both the city and citizens for periods not exceed-

ing ten years. After the assent of the gas-company to the ordinance is given in writing, the contract is held to be binding on both parties; but of course any excessive reduction may be brought into the courts. Under this law the city of Cleveland ordered a reduction in the price of gas in 1891 from $1 to 60 cents. The case was contested in the courts; but the officials of the gas-company were forced to admit that the cost of gas in the burner, aside from depreciation of about seven cents, and profit, in both the large and the small company, then and now supplying the city, was only about forty cents per thousand feet and at times less, no allowance being made for the lighting and extinguishing of street-lamps. The editors of the leading papers and some other influential people were shown to be receiving free gas; and over $24,000 was admitted to be charged in 1890 and 1891 to insurance and depreciation, which really did not go to those purposes at all, but to expenses which the secretary-treasurer could not remember, and for which he had no vouchers or written memoranda, although the expenditure of every cent for other purposes was plainly accounted for in his books. The entrance of a competing gas-company was then being defeated in the council.

So searching was the cross-examination of the city prosecutor, Gen. Edward S. Meyer, that, with-

out waiting for the production of any testimony on his side, the two companies offered 80-cent gas for ten years with a rebate or franchise tax of 6½ per cent on this, leaving the net receipts for the company about 75 cents, while General Meyer was of opinion that if he had felt sure of the perseverance of the city government a little longer he could have readily secured the original demand of 60 cents.

As one of the Cleveland companies, the Peoples' Gas-Light and Coke Company, which has paid good dividends on the reduced price, had total sales of only 161,000,000 feet in 1893–1894, and 208,000,000 in 1896–1897, or less than several other companies as well situated with respect to raw material as other Ohio cities, it is quite remarkable that no vigorous effort has been made elsewhere to follow Cleveland's method of price reduction. Probably one explanation is to be found in such relations between city governments and gas-companies as are typified in an incident of a few years ago — not over ten — in Cincinnati. On the completion of a new gas-holder the famous head of the gas-company in that city, General Hickenlooper, entertained the entire city government with a dinner in the empty holder. Many a city government has been, in more ways than one, ingulfed in the holders of our city monopolies.

This Ohio method of price reduction, however,

seems legally open to city councils in many other States, and, as previously suggested, should be tried even as a preliminary to public purchase of the plants; because such regulation of price, so far as the courts will permit, would naturally result in a reduction in the value of the securities of the monopoly to a point much nearer the cost of duplication than now, and thus render easier public purchase. It cannot be claimed that such a policy is unjust, at least in the great majority of cases, where companies have already divided in stock and cash dividends enough to have given a fair return from the start on the structural value of the plant or the cash investment, and to have paid for all depreciation charges. If a company has preferred to pay its stockholders exorbitant and even unearned profits rather than to charge off proper amounts for depreciation, that is, of course, the lookout of the company. No corporation, any more than an individual, can expect the public to permit it to eat its cake and have it too. It is evident, however, that this method of control can only be supplementary to others, and is not likely to be widely enough adopted to become a solution of monopolistic abuses.

DIFFICULTIES OF REGULATION.

Regulation of city monopolies is indeed much better than nothing, but is far from a final or sat-

isfactory solution of the problem. That one of our scientific students most favorable to regulation is Prof. John H. Gray, of the Northwestern University, who thinks we ought to try this method and improve our municipal accounts before we "plunge" into public ownership. After a most careful examination of the Massachusetts situation, obtained by personal study in the office of the Gas and Electric Light Commission, he reaches the following interesting conclusions: [1] —

1. That the law creating this Massachusetts Commission was drawn by the attorney of the Boston Gas Company, and introduced into the Boston Board of Aldermen by his brother, and then was introduced by this body into the Legislature.

2. That the requirement in some cities that monopolies shall make sworn returns is "morally degrading and economically useless, where no right or practice of verification of such report exists." That in most cases where States do reserve the right of audit and inspection, "the bad traditions of administration, the well-known hostility of the corporations to the exercise of this right, and the recognized weakness of the State governments, make such an effective examination practically impossible. In fact, the corporations

[1] See articles in the *Quarterly Journal of Economics* during 1898 and 1899, and especially *Municipal Affairs*, June, 1898.

often exercise a direct and powerful influence on the election and appointment to office, with a view to keeping the governments incapable of enforcing this right."

3. That Massachusetts is the only State that has "ever succeeded in finding out substantially what the gas-companies have actually done," and that "it is highly doubtful if even Massachusetts, probably the best governed of our States, could ever have got at these facts except under tacit agreement on the part of the Commission to withhold these returns from the public."

4. "There is no doubt that our age has become so thoroughly commercialized, and the corporations have been allowed to practice all sorts of abuses, and conduct business without effective State regulations so long, that in the present backward condition of political education and disorganized public administration, the private corporations are stronger than the governments."

5. "No act of compensation or regulation can be effective until the companies are convinced that they will be better off under it than under present or impending legislation. . . . No regulation Act beneficial to the public can be passed without the consent of the gas-companies, nor can it be enforced without their co-operation. . . . The Act establishing the [gas] Commission was drafted by and passed at the instigation of the Boston com-

panies. The control over the companies was the price they were willing to pay for protection against competing companies."

6. "It has been claimed that the Commission has not done all that the public expected of it; that it has even winked at the violation of law by the companies, and that, too, in particulars over which it was given special jurisdiction. While the charge is possibly true, it is equally probable that the greatest wisdom the Commission has ever exhibited is just at this point. It has probably done all that it could do and continue to exist."

It seems to be the idea of Professor Gray and other friends of State regulation, that the Commission is doing all that it can in the present state of public opinion, if it puts some restrictions on over-capitalization and the appearance of competing companies, while it quietly gathers and locks up in its vaults a large mass of information which another generation may be able to examine. The public must wait patiently until these facts are gathered, and until the much later time when they can be given to the public, "or we shall be plunged into reckless socialism and experiments." Unless we greatly misread the temper of the American people, however, they will not wait in patience at the feet of the monopolist, nor will they offer him still larger profits than he now gets, in return for the information that he

might thus give, under a tacit pledge of secrecy, to some State official or even in return for the concession to the public of the right to restrict stock-watering. Public opinion needs but to realize fully this intolerable situation in order to adopt regulating methods that will regulate, or to follow the example of England in municipal operation. The latter is likely to prove the line of least resistance, and will not be stopped by the cry of socialism. The application to other public utilities of the principles of public ownership and operation that have proved successful with our water-works may seem to some minds socialism, but it is evidently not a kind that will alarm most people. If such an outcome does appear, the monopolist who has resisted or weakened national public regulation will have only himself to thank for the result.

It is not a choice between a present satisfactory relation with city monopolies in any part of the country and possibilities of the spoils system under public ownership. Conditions could scarcely be worse in the matter of political demoralization and lack of common honesty than they now are. A professor in a prominent Pennsylvania university was some time ago given to understand that if he would give an opinion favorable to the lease or sale of the water-works of his city his opinion would be worth fully $25,000, and he says that

prices have risen since then. The demonetization of silver has apparently caused no fall in bribes!

The chief attorney of one of our great railway systems says that he was the only railroad representative that recently refused to bribe the city council of one of our greatest cities in order to get valuable permits which would be of general advantage to the city. If the other roads had united with his the same permits could have been obtained, he thought, in an honorable way; but in discouragement because of their preference for bribery he feels forced to follow their example.

The governor of one of our large States was offered the chance to buy 20,000 shares of stock without any cash payment down if he would sign a certain franchise measure. He was assured and believed that his signature would probably raise the value of those shares from $1,400,000 to $2,000,000. Although he did not sign the bill, a similar one was signed by his successor, and was attended with an even greater rise of value of the securities.

Governor Pingree, when mayor of Detroit, was offered $50,000 by those who claimed to be the agents of one company, and a trip around the world by the agent of another company, if he would refrain from vetoing certain franchises.

In his address before the Nineteenth Century Club of New York City, Nov. 11, 1897, the governor said: —

"Good municipal government is an impossibility while valuable franchises are to be had and can be obtained by corrupt use of money in bribing public servants. . . . I believe the time has come for municipal ownership of street-railway lines, water, gas, electric-lighting, telephone, and other necessary public conveniences, which by their nature are monopolies."

Said Mayor Swift, when mayor of Chicago, in an address given on Dec. 28, 1896, to the wealthy Commercial Club of his city: —

"Talk about anarchy: talk about breathing the spirit of commercialism! What does it more than the representative citizens of Chicago? . . . Who bribes the Common Council? It is not the men in the common walks of life. It is you representative citizens, you capitalists, you business men. When have they come to the front, either individually or collectively, and inveighed against this manner of obtaining franchises? When will they come to the front, individually or collectively, and ask of the Common Council to demand adequate remuneration of the city? Never to my knowledge."

Many of our newspapers are muzzled. Mr. Henry Doherty, of the Columbus, Ohio, Gas Company, in an address before the twentieth annual meeting of the Ohio Gas-Light Association, at Cincinnati, March 18, 1896,[1] said: —

"Keep the newspapers on your staff, also the city authorities. Now how to do this is sometimes a problem. . . .

[1] See *Progressive Age*, April 1, 1896.

Say you would go to the managers and proprietors of your newspapers with such a proposition as this: 'I have a few shares of stock to sell you on the following terms: I will take your note, secured by indorsing the stock over to me, with interest at a rate less than the earning capacity of the stock, with privilege of paying it at any time, upon giving sixty days' notice.' To be brief, it should be our business to-day to keep the stock of our companies distributed among those who are in a position to promote the welfare of our business."

In February, 1896, Judge Rhea, counsel for A. J. Blethen, the former editor of the *Minneapolis Tribune*, thus described in court, according to a local paper,[1] the relations between the *Tribune* and Mr. Lowry, president of the street railways of Minneapolis and St. Paul: —

"Mr. Lowry desired a newspaper in one of the cities friendly to his interests. The *Globe* was proposed and rejected, and Mr. William Henry Smith, as manager of the Associated Press, called Mr. Lowry's attention to him [Blethen]. Meetings were arranged between Blethen, Lowry, and Smith, at New York and St. Paul. Mr. Lowry said that he needed an organ, for his franchise was for animal power only, and not very secure. At Mr. Lowry's suggestion Mr. Blethen made the purchase for $250,000 [stock of the *Tribune*]. . . . Mr. Lowry agreed to indorse Blethen's paper for balance of purchase price. From that time the editorial policy of the paper was conducted in Mr. Lowry's interests, and he was always consulted. At that time Anderson and Douglas made the cities a proposition for a cable

[1] See *Minneapolis Journal*, Feb. 10, 1896.

line. Every paper in the city of Minneapolis favored it except the *Tribune*, which fought it with fifty or more editorials. Some claimed that Mr. Lowry was part owner of the *Tribune*. Of course Blethen peremptorily denied the allegation. Mr. Blethen was technically the proprietor of the paper, and it would never do to allow the people to know that Lowry had indorsed his paper for $160,000."

In a certain large city the gas-company refused to sell stock to a gentleman because he had not sufficient influence locally. The company said that they desired to have their stock owned by influential people, who could help them when questions of franchise and taxation arose.

ADVANTAGES OF MUNICIPAL OPERATION.

The greatest advantage of municipal ownership is its tendency to relieve communities from corrupting relations with men of wealth, described in the last few paragraphs. Some believe that merely the form of corruption would be changed thereby; that, instead of the corruption of the city council by franchise-seeking corporations, there would come the corruption of the spoils system. Even if this should at first prove true, the spoilsmen can be cuffed and kicked about in the gutter *ad libitum* without the slightest danger to one's social or business position. In fact, it is becoming almost the fashionable thing to express disgust at the political office-seeker. With the

growing need of civil service reform, which the increase of public activities is sure to force upon public attention, the spoils system is likely to die unhonored and despised.

Our rich and influential citizens, whose financial interests, as investors in franchises, now prompt them to desire weak or corrupt government, would, under public operation, have no financial interests at stake, except as taxpayers, and in that capacity would desire efficient administration. To attempt reform to-day in public regulation of private ownership is to endanger one's position as editor, professor, preacher, attorney, or man of affairs, since the men who gain by existing corruption and degradation of government are the leading supporters of our churches, our colleges, and our business. Against such people reform has hard sledding.

Those who urge that the annexation of the Philippines will so burden our consular service as to force its reform can certainly not reject the argument that there is more likelihood that the increase in the functions of city government will increase the forces of reform, since abuses here will be more closely brought to our citizens than in the case of distant islands.

Our most eminent student of municipal problems, Dr. Albert Shaw, suggests the same thought, that it is likely to be easier to reform government

under public than under private ownership. He says: —

"The practical situation in the United States is rapidly shifting the burden of proof. The relations existing notoriously between great corporations and our State legislatures and municipal governments are forcing upon us the question, not whether in some directions the business functions of Government can be safely or wisely extended, but, rather, the question how to avoid a very expensive increase of public functions as the only visible retreat from the intolerable state of demoralization into which Government has fallen. The enormous sums of money contributed for purposes of political control by the corporations enjoying municipal-supply privileges, have given us the boss system in its present form. And the boss system, which in fact knows no distinctions of political party, is fast destroying State and municipal government as the steadfast and loyal servitor, defender, and promoter of the public interest.

"With honest, independent, and truly representative government, such as our forefathers knew, and such as they hoped would be ours in perpetuity, it would seem to me a matter of comparatively little moment whether the public welfare were served by the municipal ownership and operation of gas-plants, or, under fair terms, by a private company. On some accounts I should considerably prefer the latter alternative. But with weak and flabby government, lacking in moral stamina, and lacking the intellectual force to make advantageous bargains with private corporations, I should be inclined to the opinion that direct ownership and operation, as offering less temptation, might well have better results for the community in some cases. At least it would tend to build up the municipal government on the side of its dignity and pres-

tige; so that, in the end, it might possess enough character, intelligence, and stability to be able to meet a transit company or a lighting company on something like equal terms, and grant a franchise on terms which would not involve the betrayal of the rights of the community."[1]

Not only does municipal ownership and operation tend to transform a large element of the wealthy from interested opponents to friends of good government, but it tends to develop the civic interests of the mass of voters. This view was ably presented at the National Municipal League in December, 1898, by Mr. Charles Richardson of Philadelphia, in a paper indorsed by the other members of the Special Committee on municipal programme. He says: —

"As the character of every Republican government must depend in the last analysis upon the active interest of the voters, it is obvious that every lease or agreement which ties the hands of a local government, and lessens its ability to serve and protect the voters, must tend to diminish their interest in supporting or improving it. While it is not possible to strip a city government so entirely of power as to make it incapable of attracting the efforts, or serving the purposes of bad men, it is possible to render it so powerless to accomplish good or restrain evil, that the average citizen can no longer be induced to take an active interest in it.

"There is much force in the argument that so long as each voter can directly affect the character and the conduct of his local government his interest in it will be in propor-

[1] *New York Independent*, May 6, 1897.

tion to the number, importance, and directness of the different ways in which that government serves and affects him. So far as he may come to regard it as his business agent he will want to guard and improve it. So far as it becomes the servile instrument of private corporations in which he has no voice or share, he will cease to respect or care for it. . . . And it should be remembered that a large majority of the voters have no private property directly subject to assessment, and are therefore much more likely to take an interest in the management of their public property and public services than they are in any questions of municipal income or rates of taxation. If we want the people to develop higher civic ideals we must enlarge the scope and importance of their city government. If we want them to appreciate the advantages of intelligence and fidelity in their public servants, we must give those servants such duties and responsibilities that incompetence and dishonesty can neither be concealed nor endured."

Mayor Jones declared at the annual convention of the League of American Municipalities at Detroit, August 4, 1898: —

"The greatest good that we are to find through municipal ownership will be found in the improved quality of our citizenship, . . . because of the family feeling and truly patriotic sentiment, the love of country, which is love of our fellow-man, that will be awakened in man's breast by the contemplation of the fact that he is a member of a family which owns its own streets, which owns its own bridges, which owns its own water-works, which owns its own lighting plants, which owns its own telephone and express and messenger service; a member of a family which owns and does everything for the family that can by any possibility be better done by collective than by private effort."

Another reason for public ownership is its tendency to give higher wages and shorter hours to workingmen, and to permit their membership in labor organizations. To be sure, public employment in America sometimes errs on the other side by making the contrast too great between private and public business, and by not insisting rigidly upon efficiency somewhat in proportion to the pay given. This lessens the interest of the masses in civil service reform, which seems to erect barriers against the passing around among many people of these lucrative public jobs. But within such limits as the common sense of the people is likely in the long run to insist upon, there are many advantages in this tendency to better pay and shorter hours in public work.

A fourth reason for municipal ownership and operation, which the writer has never heard or seen discussed, but which appears very important, arises from the custom in America of making abutting land pay for street improvements which enhance the value of the land. Under private ownership thousands of owners of suburban land are made rich in every city by the increase of land values through the construction of street railways, gas-works, electric-light and telephone wires, as well as by water-mains, street-paving, and sidewalks. There would be no injustice, but the greatest public advantage, under

public ownership, in paying for these extensions by special assessments on the increased value of these suburban lots.

A fifth reason for municipal ownership and operation arises from the acknowledged tendency of such management to render service at the lowest price consistent with payment of a low rate of interest, and perhaps the accumulation of a sinking-fund that shall ultimately render unnecessary all interest charges, while the natural tendency of private operation is to charge such a price as will give the highest net profit. Such a price is likely to be higher than that which will yield merely 4 to 5 per cent interest of the capital invested. There are such large social benefits from reduction in charges of street transportation, the telephone, electric light, gas for fuel and illumination, etc., that there is special reason for applying public ownership to that class of monopolies.

Finally, and as a result of the tendency of public operation as just spoken of, the argument from experience and statistical comparisons of public and private plants similarly situated is, on the whole, favorable to municipal undertakings of the character under discussion.

The position is well stated by a vigorous opponent of public ownership, Mr. Allen Ripley Foote, who gives a most important and unintended argument in its favor when trying to show how statis-

tical comparisons between public and private plants are unfair.[1] He says a public plant "has no expensive conflicts with the municipal councils, nor is it compelled to maintain a lobby, resort to bribery, give interest in stocks or bonds to politicians, or fee able attorneys to watch 'strikes' in the legislature or council, and to resist unjust taxation. It does not have to 'fight' to obtain new legislation or ordinance before it can extend or improve its service, or make changes in its motive power. These suggested disabilities under which every public service corporation operates to a greater or less degree, none of which inhere in the conditions imposed upon municipalities, tend to increase capitalization, increase rates of interest and the cost of operation, through fixed charges or otherwise, and correspondingly to increase the necessary price charged users for the service rendered."

The preceding chapters have illustrated this reason for public operation — the financial advantages to the taxpayer and consumer.

Since the chapter on electric light has gone to press the writer has received the report made in the summer of 1898 by Ex-Mayor Matthews, of Boston, as agent of the Boston Electric Light Company. In this he attempts to defend the position that a new contract of the private Boston Company, for 2,749 arc lights at $127.75 per light, is cheaper by about $7 than would be the cost of Detroit municipal

[1] *Municipal Affairs*, June, 1897. Article, "No Government Should Operate an Industry."

lights on a commercial basis, if due allowance were made for fixed charges, depreciation, difference in the cost of coal, larger proportion of conduits, etc., in Boston. The comparison is unfair by reason of the smaller number of street-lights — only 1,744 — and the entire absence of commercial lighting in the Detroit public plant. Mr. Matthews admits that to reach his result he must add over $10 to the legitimate cost of the municipal plant, because a private company would demand 6 per cent return on the investment instead of 4 per cent, and would have to pay nearly $2 more per light for insurance, fire, and liability to cover the profits of a private insurance company. Mr. Matthews further charges for depreciation 7½ per cent instead of 5 per cent; although the latter is considered ample by competent engineers, and is twice the average allowance in the private companies of Massachusetts. On Mr. Matthews's own showing, therefore, without any attempt at criticism for the moment of his other computations, or making any allowance for the difference in the number of lights, a municipal plant in Boston could set aside 5 per cent depreciation yearly and still furnish light for $110 a year, thus saving at least $17.75 a light under public ownership, which would amount, on 2,749 lights, to $48,795 per year. This amount of advantage Boston consents to forego in order to continue to enjoy the supposed blessings of private ownership.

OBJECTIONS AND DIFFICULTIES.

Aside from the dangers of the spoils system, which have just been considered, it is claimed that public operation is socialistic. This argument would apply equally well to the Post-Office, and has ceased to be a bugbear. Those who con-

sider this claim usually add that the danger is that communities will not know when to stop in their assumption of business enterprises. Similarly, a man should not eat, lest he fail to realize when he has had enough.

Mr. Garcke, the editor of an excellent "Manual of Statistics of Electrical Undertakings," in Great Britain, and an advocate of municipal electric lighting, objects to municipal tramways on the ground that the development of England will be hastened by lines running through several towns, as does the West End System of Massachusetts. He does not see how municipal ownership and operation can accommodate itself to this need. In America the problem is not so serious, because only small towns are usually near a large city. The latter annexes most of its suburbs; and if, as is most likely, a city uses its tramway lines to secure cheap transportation rather than a large profit, it is not likely that outlying towns would often seek to check the growth of a city-owned line, any more than now in the case of private lines that seek extension into suburbs. It is also possible to develop a new center of local government for the purpose of operating street railways through many townships, as was done in Cook County, Illinois, when a large sanitary district was organized to build the drainage canal from Chicago to the Illinois River. It is also quite

likely that interurban lines may be left to private management for some time after public ownership is tried in cities. It is not found difficult in Chicago for outlying roads to be operated by independent companies that transfer to the great central systems, or that quite often connect with them without transfers.

The most serious objection to municipal ownership and operation is the possibility that such operation would not be so progressive in the testing of the latest inventions and in extensions to undeveloped territory as is the present system. This it is impossible to determine, save by reference to experience with water and electric-light plants in this country, and with such plants, together with gas and telephone systems abroad. In all these cases, extension to new territories seems to have been as characteristic of public as of private ownership. American water-works frequently extend their mains where private companies have refused to go for lack of the prospect of immediate returns. Publicly owned gas-works of England seem as ready to adopt water-gas, or labor-saving machinery in charging their retorts with coal as do the private works.

By way of partial reconciliation between the over-haste of some advocates of municipalization and the exaggerated fears of opponents, it should be added, that as the matter is likely to work itself

out in practice, the question is not going to be one of sudden transition, but rather one of gradual experimentation. Each municipality will watch critically the results elsewhere, and hasten or retard its own action according to evidence of success or failure in other places similarly circumstanced. Neither is the question one of universal transition from private to public management. For some time to come, all that America is likely to see is an imitation of what now appears in England, namely, the spectacle of public and private plants working, side by side, in adjoining cities, each a check upon the other, until it is clearly demonstrated which offers the greatest economic, political, and social advantages.

The obstacles in the way of municipalization are still very great in this country. The *Progressive Age* for August, 1897, reports that the Northwestern Electric Association, at a meeting, July 15 of that year,

"unanimously and enthusiastically adopted a report recommending the appointment of a committee of three to act for the association, and prevent by all honorable means the establishment of any municipal and opposition plants; to gather facts and figures in regard to municipal lighting, that will be of use to central stations which are threatened with municipal opposition; confer with the manufacturers of electrical apparatus, and secure, if possible, their willingness to be guided by the wishes of this association; to investigate every appeal that is made to them through any

of the central stations, managers, or owners in our territory, and if satisfied that the local plant is ready to deal honestly, fairly, and justly with the municipality or the citizens, they will request that the manufacturers of electrical machinery shall not bid on a proposed plant."

It will be very difficult, for some time to come, to get through legislatures and city councils, in the teeth of wealthy interests, such changes in city charters and methods of dealing with franchises as will permit city management, even when desired, as it probably is to-day by the mass of city voters.

Where cities have reached the limit of debt, and cannot secure from the State the right to introduce in their charters the wise provisions sanctioned by the National Municipal League relative to the power to increase debts when for revenue-producing enterprises, the Des Moines method may be employed. McCaskey & Holcomb, Electric Light Contractors, have agreed to construct a good plant, and to operate 500 arc lights all night every night for $62.50 each, the city to levy a two-mill tax for two years, supposed to yield about $60,000, and the balance of the cost of construction of $45,000 for a plant with a capacity of 600 arcs and 1,500 incandescents for city buildings, to be paid out of the lighting-fund from what is saved through reduction in rates. It has been estimated that two years on this basis would suf-

fice to pay for the plant, the company to operate until paid for. Some litigation with the old company has thus far prevented the acceptance of the contractor's offer, but the plan appears feasible for many cities.

Another method is that in vogue in the electric-light plant in Springfield, Ill., described on pages 281–285 of this book.

MUNICIPAL OPERATION. — ITS RECENT GROWTH.

The facts already given in this book prove the rapid development of municipal operation, although the magnitude of this movement is disputed by no one. Of the 50 largest cities in the United States, 41 have public water-works, 19 of these have changed from private ownership, while only one large city, New Orleans, has changed from public to private management. In England and Wales, 45 of the 64 great towns and county boroughs own their water-works, as do all the large towns in Scotland, and Dublin, Belfast, and Cork in Ireland. In November, 1898, the London County Council, by 101 to 15, decided to proceed immediately to obtain Parliamentary permission for owning and operating its water supply.

The rapid development of municipal electric light has also been noted in the United States, the number of plants having grown from 200 in 1892 to nearly 400 in 1898. In Great Britain and Ire-

land, even including London, where private ownership secured a great start, municipalities sold, in 1895, 31.9 per cent of the 30,203,766 kilowatts of total consumption of electric energy, and in 1897, 45.2 per cent of the 60,125,476 kilowatts, or Board of Trade units of consumption. In the latter year 36 private British companies reported an average price of 5.62*d*., or about 11 cents per kilowatt, according to our authority for these figures, Garcke's "Manual," and a profit of 6.54 per cent on the capital invested, while 54 municipalities reported an average price of 4.68*d*., or about 9.3 cents per kilowatt, and a profit of 5.73 per cent.

In the case of gas, progress toward municipalization has been greatly checked everywhere by the development of electric light; but this check will be only temporary if municipalities realize the real importance of this illuminant and fuel. The number of public gas-works in America in 1898 was 11, and in England 212, or almost one-third (32.7 per cent) of the 648 companies. These public plants sold 36.4 per cent of all the gas used in the United Kingdom, and about one-half of that outside of London; and in the entire kingdom had 48.8 per cent of the total number of consumers.

As shown in Chapter IV., public operation of telephones is rapidly developing on the continent of Europe, and a parliamentary committee has just

given a unanimous report in favor of the development of such operation on a large scale in Great Britain.

With respect to street railways, only a beginning has been made in America in the case of the Brooklyn Bridge; but of the 1,057 miles of track in the United Kingdom, 318 miles, or 21 per cent, are publicly operated, in 16 cities. Consul Boyle, of Liverpool, writes to our government that public ownership of street railways has progressed so far that American electricians desiring English contracts need not have a list of cities with such publicly owned enterprises, "as nearly every city and town of importance in Great Britain has such work under progress or in contemplation, . . . and those interested can hardly go astray by addressing the city engineer of any large city in England or Scotland; and the same suggestion holds good to a limited extent for Irish and Welsh municipalities."

Although the American movement is behind the English or the German in its record of accomplishments, the development of public opinion toward municipalization is advancing in America with extraordinary strides. The American Federation of Labor, with over half a million members among our skilled workers, adopted with scarcely any opposition, in its annual convention in December, 1896, the following resolution, which it has practically reiterated in subsequent sessions: —

"Whereas, The influences of corporations, holding or seeking to obtain possession of public franchises, are among the most potent influences antagonistic to reformative measures, and the most active cause of corruption in politics and of mismanagement and extravagance in public administration; therefore, be it

"Resolved, That the sixteenth annual convention of the American Federation of Labor urges upon all the members of affiliated bodies that they use every possible effort to assist in the substitution, in all public utilities — municipal, State, and national — that are in the nature of monopolies, of public ownership for corporate and private control."

At the Detroit convention of the League of American Municipalities in August, 1898, when 1,500 members of the city councils and other branches of city governments and many prominent mayors were present from cities in all parts of the country, the sentiment was overwhelmingly in favor of municipal ownership and operation of public utilities. In a recent symposium in a New York daily, the mayors of Atlanta, Cincinnati, Toledo, and St. Paul took this position, which Governor Pingree is also vigorously championing.

At the December convention, 1898, of the National Municipal League, a municipal programme and a model charter were presented by such eminent students of municipal government as Dr. Albert Shaw, Horace E. Deming, and Professor Frank J. Goodnow, of New York, Charles Richardson, Clinton Rogers Woodruff, and Professor Leo S. Rowe,

of Philadelphia. In this model city charter it was provided that cities "may acquire or construct and may also operate on their own account . . . railroads or other means of transit or transportation and methods for the production or transmission of heat, light, electricity, or other power in any of their forms, by pipes, wires, or other means," and that a city may also issue bonds without debt-limit restrictions, if their bonds are for a revenue producing business.

It was advised that cities of more than 25,000 inhabitants should have the same right of making their charters and providing for the ownership and operation of any public utilities that is now possessed by the people of a State in the making of State constitutions. The limitation of municipal franchises to 21 years, public audit of the accounts of companies receiving franchises, and other public safeguards were also urged.

Instead of providing, as did Connecticut in 1893, that public ownership could not occur without "a two-thirds majority vote at each of two legal town or borough meetings, duly called for that purpose," and not less than a year apart, this able committee of the League proposed that a two-thirds vote of the members of the Council and a majority vote of the voters at one election should be sufficient for the issue of bonds and the assumption of any "undertaking from which the city will derive a

revenue ; " while the alienation of any city property could not occur without the vote of four-fifths of the city council, and any referendum vote that the people might arrange for in their charter.

In arguing that a city should have the right of municipal ownership and operation, Dr. Albert Shaw stated, in a paper approved by his colleagues : —

" It is certainly an anomaly, from which we must try to deliver ourselves in this country, that a private corporation may be formed, at no expense and with very doubtful capital and financial responsibility, for the sake of invading a municipal corporation, there to perform public functions of the highest importance, such as municipal transit, for example, while the municipal corporation itself, having the highest and most vital interest in that whole matter, is placed at a disadvantage by the laws of the State, so that it is altogether likely to be severely discriminated against if it should try, on its own behalf, with the entire approval of the great body of the citizens, to render such public service."

In addition to the legal decisions permitting city ownership that were quoted by Professor Parsons, in Chapter VI., notably that of the Supreme Court of the United States in the Hamilton, Ohio, case, a remarkable decision was made by the Indiana Supreme Court, at the time when the city of Crawfordsville sought to establish an electric-light plant for lighting the streets, and for

selling to private consumers.[1] The only statute bearing upon the question simply permitted any city council to contract with a private corporation for lighting streets and public buildings. The court held that in the implied police powers of a municipality was that of lighting streets and public buildings. "We can see no good reason why it [the municipality] may not also, at the same time, furnish it [the electric light] to the inhabitants to light their residences and places of business. To do so, in our opinion, is a legitimate exercise of the police power for the preservation of property and health."

The movement for municipalization in America, as in Europe, has gone beyond the stage of academic discussion, or the demands of impractical enthusiasts. One can now admit a belief in ownership by the people of monopolies which concern the people of town or city, without losing the respect of either our wealthy or professional classes. No one agent is doing so much to hasten the movement as the grasping private owners of many of these monopolies, who are riding roughshod over the rights of the people, and convincing all that the corrupting power of corporate influence over legislation is growing, both on Beacon Hill,

[1] City of Crawfordsville *vs.* Braden, 130 Indiana, 149, 30, American State Reports, 214, quoted in "Municipal Home Rule," by Goodnow, pp. 47, 49.

in sight of Faneuil Hall, and near the grave of Lincoln in the capital of Illinois. The one agent that can make the inevitable anger of the people redound to true progress, is he who attempts to improve our civil service, and introduces conservative legislation, based upon faith in the common people and in the growth of an industrial democracy which shall bring on the people to the exercise of all the public spirit and civic patriotism of which they are capable. To quote the words of one of our most progressive mayors, Mr. Jones of Toledo: —

"To say that a private corporation can . . . serve the people better than they can serve themselves is an unwarranted assumption of superiority on the part of those who make the claim. It is a flagrant manifestation of a lack of the spirit of patriotism, for no man who is truly patriotic will be willing to confess to a desire to use the people of his city simply for what he can make out of them. The city government is here for the benefit of all the people; and those who love the city will be quite as ready to show their patriotism by serving the city in those fields where they possess superiority, whether it be by making gas or other service, as were the patriots who went to Cuba and gave their lives in front of Santiago."

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